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ABSTRACT

This study examined how competitive market dynamics between 1994 and 2000 have affected the financial stability of Academic Health Center (AHC) hospitals and their ability to support their academic and social missions. It looked at the financial challenges facing AHC hospitals through a survey involving 1,138 teaching hospitals. Findings demonstrate that fewer financial resources are currently available to subsidize mission-related activities than at any other time since 1994. Although the analysis focused on AHC hospitals, the authors considered other teaching hospitals and other types of hospitals. The financial strength of AHC hospitals has decreased to the point that their ability to fulfill their social missions appears to be at risk. In the aggregate, AHC hospitals derived their entire financial surplus from nonoperating revenue, which was used to offset operating losses. By 2001, less than half of AHC hospitals had positive operating margins. If these trends continue, or even stabilize, AHC hospitals might not be able to maintain their traditional commitments to education, research, and their communities. The observed decrease in private payer payments relative to costs for AHC hospitals may not be due to increased hospital costs. In recent years, AHC hospitals have controlled costs and generally become more cost efficient, but it is difficult to predict the form insurance payments will take and the future of employer's health care plans. An appendix contains a hospital efficiency model. (Contains 32 exhibits.) (SLD)

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FINANCIAL PERFORMANCE OF ACADEMIC HEALTH CENTER HOSPITALS, 1994–2000

Allen Dobson, Lane Koenig, Namrata Sen, Silver Ho, and Jawaria Gilani
The Lewin Group, Inc.

September 2002

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EXECUTIVE SUMMARY

Academic health centers (AHCs) and their affiliated hospitals play a critical role in the delivery of health care in the United States. Their commitment to teaching and research, providing sophisticated clinical care for patients with medically complex problems, and caring for the poor is vital to our health care system. Public and private payers of medical benefits have long recognized that, although the academic and social missions pursued by these institutions are beneficial to society, they also result in higher patient care costs. Estimates indicate that mission-related activities account for roughly 30 percent of the cost per case at AHC hospitals.[1] As the nation's health care system became more competitive during the 1990s, managed care organizations and other payers questioned these higher costs through aggressive contract negotiations.

Traditionally, the nation's AHCs and other teaching hospitals have relied on patient care revenue to subsidize a portion of their mission-related activities. The funding structure is built on private payer payments and, to some extent, Medicare payments, exceeding patient care costs. Consequently, changes in the health care market that result in reductions in clinical revenue place AHC hospitals at financial risk and undermine their capacity to carry out mission-related activities.

This report examines how competitive market dynamics between 1994 and 2000 have affected the financial stability of AHC hospitals and their ability to support their academic and social missions. It looks at the financial challenges facing AHC hospitals and demonstrates that fewer financial resources are currently available to subsidize mission-related activities than at any other time since 1994. Although the analysis focuses on AHC hospitals, the authors consider other teaching hospitals as well as other types of hospitals.

AHC Hospitals' Total Margins Have Declined Since 1996 and Operating Margins Were Negative in 1999 and 2000

In recent years, the financial strength of AHC hospitals has decreased to the point that the hospitals' ability to fulfill their social missions appears to be at risk. As shown in Exhibit ES-1, aggregate total and operating margins for AHC hospitals were lower in 2000 than at any other time since 1994 (1.7% and –1.4%, respectively).[2] Moreover, the deterioration in the aggregate financial performance experienced by these institutions between 1994 and

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[1] James A. Reuter, *The Financing of Academic Health Centers: A Chart Book* (New York: The Commonwealth Fund Task Force on Academic Health Centers, September 1997); Robert Mechanic, Kevin Coleman, and Allen Dobson, "Teaching Hospital Costs: Implications for Academic Missions in a Competitive Market," *Journal of the American Medical Association* 280 (September 16, 1998): 1015–19.

[2] Total margin = (net revenue – total hospital expenses)/net revenue; operating margin = (net revenue – non-operating revenue – total hospital expenses)/(net revenue – non-operating revenue).

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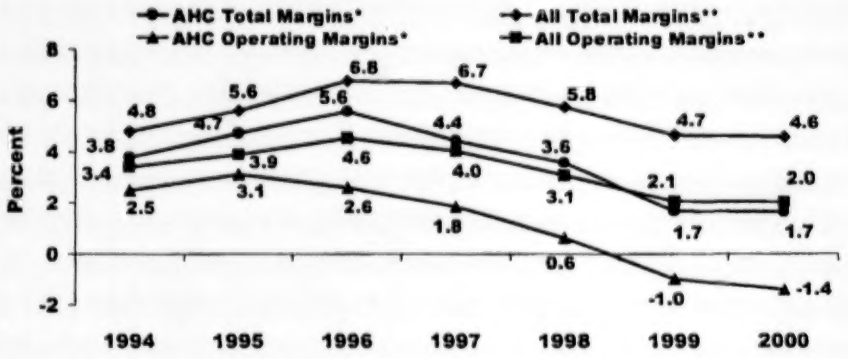
2000 was greater than that experienced by non-teaching and other teaching hospitals during the same time period (results not shown in Exhibit ES-1). In aggregate, AHC hospitals derived their entire financial surplus from non-operating revenue, which was used to offset operating losses.

Exhibit ES-1. Trends in Aggregate Total Margins and Operating Margins for AHCs, 1994–2000



Total Margin = (net revenue – total hospital expenses)/net revenue.
Operating Margin = (net revenue – non-operating revenue – total hospital expenses)/(net revenue – non-operating revenue).
* Includes reported community hospitals data only.
** Includes reported and imputed community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

As shown in Exhibit ES-2, by 2000, less than half of AHC hospitals had positive operating margins. If these financial trends continue or even stabilize, AHC hospitals might not be able to maintain their traditional commitments to education, research, and their communities.

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Exhibit ES-2. Percent of AHC Hospitals with Positive Margins, 1994–2000

Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Reduced Private Payer Payments and Increased Uncompensated Care Adversely Affect AHC Hospitals' Financial Performance

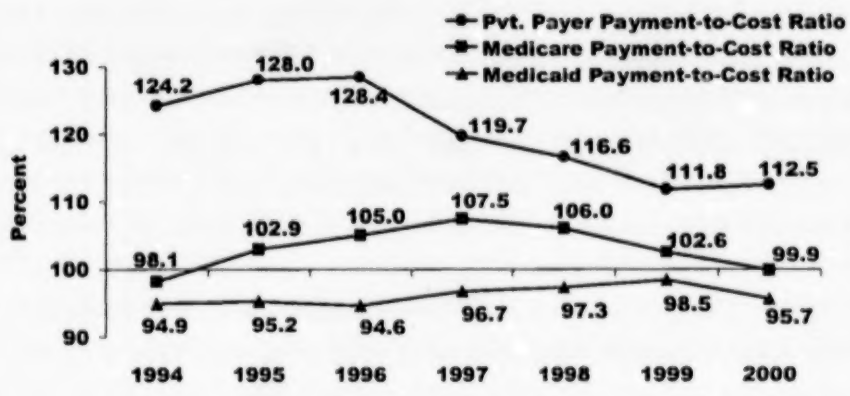
Private payers appear far less willing than in the past to support the high costs of AHC hospitals. Private payer payments as a percentage of costs have declined from 128.4 percent in 1996 to 112.5 percent in 2000 (Exhibit ES-3). These higher payments had previously enabled AHCs to subsidize their academic and social missions.

Despite cuts initiated by the Balanced Budget Act of 1997, Medicare paid nearly all of its patient care costs at AHC hospitals, and Medicaid paid slightly less than its costs. Notably, both Medicare and Medicaid payments relative to costs in 2000 (99.9% and 95.7%, respectively) were greater than in 1994 (98.1% and 94.9%, respectively). Thus, the overall declining performance of AHC hospitals between 1994 and 2000 is primarily due to the pronounced decrease in private payer payments relative to costs and increases in uncompensated care.

Two distinguishing features of AHC hospitals are their high and increasing level of uncompensated care and their relatively high costs. This study revealed that AHC hospitals are less cost-efficient than other hospitals, most likely due to their complex missions. However, in recent years AHC hospitals have made significant efforts to control their cost growth. Increases in uncompensated care and decreases in private payer payment-to-cost

ratios are the primary factors underlying the increasingly poor financial performance of AHC hospitals.

Exhibit ES-3. Trends in Payment-to-Cost Ratios by Payer for AHCs, 1994–2000



Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Public AHC Hospitals Are Financially Burdened by Growth of Uncompensated Care

In keeping with their mission statements, AHC hospitals, particularly public AHC hospitals, are committed to providing health care to the poor. Between 1994 and 2000, the decline in the financial performance of public AHC hospitals began earlier than the financial decline for private AHC hospitals. While private AHC hospitals depend more upon Medicare and private payers, public AHC hospitals depend more upon Medicaid as a payment source. Medicaid pays public AHC hospitals relatively well, due to disproportionate share payments.[3] But high levels of uncompensated care have diminished public AHC hospitals' overall financial strength. By 2000, total margins for private AHC hospitals had increased to 1998 levels, but total margins for public hospitals had decreased sharply.

[3] Medicaid disproportionate share payments are payments provided by the Medicaid program to hospitals to cover the shortfall for Medicaid payments and uncompensated care.

AHC Hospitals in High Managed Care Areas Are Struggling Financially

AHC hospitals located in high managed care areas performed worse than other AHC hospitals.[4] In 2000, the operating margins for these institutions (–3.5%) continued to decline, whereas the operating margins leveled off for AHC hospitals in communities with less managed care.

Uncompensated care levels for AHC hospitals in areas of high managed care concentration are high. This seems to be the dominant factor affecting their poor financial performance, given that their major payer payment-to-cost ratios are comparable to AHC hospitals in less competitive areas, e.g., areas with less managed care. The relatively high Medicare payments and roughly equal private payer payment-to-cost ratios exhibited by AHCs in high managed care areas reflect aggressive cost control by these institutions.

The market share of AHC hospitals has remained stable, in spite of the emergence of managed care. Between 1994 and 2000, the percent of total inpatient days accounted for by AHC hospitals did not change. This supports the previous assertion that the observed decline in AHC hospitals' financial performance was primarily driven by reductions in private payer payments relative to costs and increases in uncompensated care. Reductions in utilization or low Medicaid payments were not significant factors.

Low-Performing AHC Hospitals Had Lower Payments Relative to Costs for Each Major Payer in 2000

This study characterized institutions falling in the bottom quartile of all AHC hospitals in terms of total margin as "low-performing." Since these institutions face the greatest financial challenges in fulfilling their missions, a separate analysis was conducted to see if they shared common characteristics that might be associated with their financial performance. In 1994, 25 percent of AHC hospitals had total margins below 1.2 percent and operating margins below 0.2 percent. By 2000, low-performing AHC hospitals had total margins and operating margins below –1.9 percent and –3.6 percent, respectively. As shown in Exhibit ES-4, these AHC hospitals generally received below-cost Medicare and Medicaid payments and just under break-even payments from private payers. Low performers are not characterized by low occupancy rates, high numbers of full-time

[4] For these analyses, managed care penetration was defined by the HMO penetration rate as reported in various years of the InterStudy Competitive Edge Part III: Regional Market Analyses Publications. In order to identify the characteristics of the AHC hospitals based on the managed care penetration, we categorized the AHC hospitals based on the HMO penetration rates of the Metropolitan Statistical Areas (MSAs) where they are located. AHC hospitals located in areas with an HMO penetration rate above the 75th percentile were classified as AHC hospitals in "high managed care areas"; AHC hospitals located in areas with an HMO penetration rate below the 25th percentile were classified as AHC hospitals in "low managed care areas"; and all other AHC hospitals were classified as located in "medium managed care areas."

equivalent staff per bed, or higher average lengths of stay. Low-performing AHC hospitals are distinguished from high performers primarily by their low payment-to-cost ratios.

Exhibit ES-4. Comparison of Academic Health Centers by Financial Performance for 2000*

	High-Performing	Moderately Performing	Low-Performing
Number of Hospitals	24	45	24
Medicare Payment-to-Cost Ratio	104.1%	100.4%	93.1%
Medicaid Payment-to-Cost Ratio	110.4%	92.1%	91.8%
Private Payer Payment-to-Cost Ratio	117.9%	108.6%	97.4%
Full-time Equivalent Staff per Bed	6.7	7.3	6.6
Occupancy	78%	78%	75%
Average Length of Stay	6.3	6.5	6.1
Aggregate Total Margin	12.8%	1.3%	−11.7%
Aggregate Operating Margin	7.1%	−0.6%	−13.8%
Efficiency Index (Medicare)**	1.04	1.01	1.00
Percent of Uncompensated Care	5.2%	6.4%	11.1%

Low-performing hospitals include academic health centers that fell in the bottom quartile of total margins in 2000; moderately performing hospitals include academic health centers that fell in the interquartile range of total margins in 2000; high-performing hospitals include academic health centers that fell in the top quartile of total margins in 2000.

* Includes reported community hospitals data only.

** An efficiency index greater than 1 indicates relative inefficiency.

Source: The Lewin Group analysis of 2000 AHA Annual Survey data.

Future Financial Performance of AHC Hospitals Is Likely to Get Worse

The financial pressures faced by all AHC hospitals will likely intensify, given expected additional reductions in Medicare payments as mandated in the Balanced Budget Act of 1997. AHC hospitals' future financial performance also depends upon levels of uncompensated care, private payer payment levels, and Medicaid. The near-term outlook is not favorable for more generous private-sector contracting as private payers attempt to counter increased health insurance premium costs. Growing state budget deficits mean that increased Medicaid payments for AHC hospital services in the near future are also unlikely.

Discussion

This report indicates that the financial performance of AHC hospitals specifically, and teaching hospitals generally, deteriorated between 1994 and 2000. AHC hospitals' financial performance also deteriorated relative to that of other hospitals. During the same period, AHC hospitals' market share relative to other types of hospitals remained nearly unchanged, indicating that their worsening financial status has not been a result of relative

volume reductions. Neither can their financial status be attributed to lower Medicare or Medicaid payments, since payment-to-cost ratios for these programs increased slightly between 1994 and 2000. The declining performance of AHC hospitals appears, therefore, to be primarily due to the pronounced decrease in private payer payment-to-cost ratios. For some AHC hospitals, an increase in uncompensated care is also a factor.

The observed decrease in private payer payments relative to costs for AHC hospitals may not be due to increased hospital costs. In recent years, AHC hospitals have controlled costs and generally become more efficient. Yet, with health care insurance premiums rising, employers are likely to intensify their efforts to contain their health care costs. Since many employers are now hostile to managed care, it is difficult to predict the form these efforts will take. However, cost-control efforts will likely be directed at hospitals generally, given concerns over potential excess capacity, and at teaching hospitals in particular, given their relatively high costs. The effects of any cost-control policies on the financial status of hospitals could be compounded by decreases in non-operating revenue associated with the marked decline in the equities market.

For all of these reasons, the missions of AHC hospitals and other teaching hospitals could be in jeopardy. Thus, a key public policy concern is to maintain the financial stability of AHC hospitals while market forces respond to the reemergence of health care inflation.

FINANCIAL PERFORMANCE OF ACADEMIC HEALTH CENTER HOSPITALS, 1994–2000

I. INTRODUCTION

Academic health centers (AHCs) and their affiliated AHC hospitals play a critical role in the delivery of health care in the United States. Their commitment to teaching and research, providing sophisticated clinical care for patients with medically complex problems, and caring for the poor is vital to our health care system. Public and private payers of medical benefits have long recognized that, although the academic and social missions pursued by these institutions are beneficial to society, they also result in higher patient care costs. Estimates indicate that mission-related activities account for roughly 30 percent of the cost per case at AHC hospitals.[5] As the nation's health care system became more competitive during the 1990s, managed care organizations and other payers questioned these higher costs through aggressive contract negotiations.

Traditionally, the nation's teaching hospitals have relied on patient care revenue to subsidize a portion of their mission-related activities. This funding structure is built on private payer payments and, to some extent, Medicare payments, exceeding patient care costs. Consequently, changes in the health care market that result in reductions in clinical revenue place AHC hospitals at financial risk and undermine their capacity to carry out mission-related activities.

This report examines how competitive market dynamics have affected the financial stability of AHC hospitals and their ability to support their academic and social missions. It looks at the financial challenges facing AHC hospitals and demonstrates that fewer financial resources are currently available to subsidize mission-related activities than at any other time since 1994. Although the analysis focuses on AHC hospitals, the authors consider other teaching hospitals as well as other types of hospitals.

The authors document the deteriorating financial status of the nation's academic health center hospitals and other teaching hospitals, using data from the American Hospital Association's Annual Survey of Hospitals and Medicare cost reports. Observed trends in hospital margins and payment-to-cost ratios from 1994 to 2000 demonstrate that the growing financial stress placed on AHC hospitals is a result of falling private payer payment-to-cost ratios and increasing uncompensated care burdens. The report also compares the financial performance of public and private AHC hospitals, examines the

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[5] Reuter, *The Financing of Academic Health Centers*, September 1997; Mechanic et al., "Teaching Hospital Costs," *JAMA*, September 16, 1998.

impact of managed care on performance, and makes comparisons between high- and low-performing AHC hospitals.

II. METHODS

This analysis measures the financial status of academic health center hospitals (AHC hospitals) and other teaching hospitals. The Centers for Medicare and Medicaid Services (CMS) produce an Impact File each year, based on information contained in each hospital's most recent Medicare cost report. Using medical resident counts reported in the CMS 2001 Impact File, the authors identified 1,138 teaching hospitals in the 2000 American Hospital Association (AHA) survey data.[6] Hospitals with at least one medical intern or resident were classified as teaching hospitals. This group was then divided into the following classes: academic health center hospitals (119), major teaching hospitals (181), and minor teaching hospitals (838).[7] Although a number of federal hospitals, such as Veterans Administration hospitals, are also teaching institutions and may have close affiliations with medical schools, federal hospitals were excluded from this analysis.

To identify AHC hospitals, the authors used the set of integrated teaching hospitals identified by the American Association of Medical Colleges (AAMC). The AAMC defines an integrated teaching hospital as one in which a majority of clinical chiefs of staff are also department chairs in the affiliated medical school.[8] This core set of AHC hospitals was used to identify AHC hospitals in years prior to 2000. Additional AHC hospitals were chosen by identifying the individual hospitals that merged to form one of the 119 AHC hospitals in the 2000 AHA data. The "major teaching" category includes non-AHC hospitals with an intern- and resident-to-bed ratio (IRB) of 0.25 or above and at least 50 beds. The "minor teaching" category includes non-AHC hospitals with an IRB of less than 0.25 or fewer than 50 beds. The major and minor teaching hospitals were identified using the annual CMS Impact Files. The set of major and minor teaching hospitals fluctuated from year to year depending on how many hospitals met these criteria.

Financial results are also included for two other classes of hospitals: urban non-teaching hospitals with 100 or more beds (referred to as "large urban non-teaching hospitals") and "all hospitals." Since most teaching hospitals, particularly AHC hospitals and other major teaching hospitals, are large and located in urban areas, the large urban

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[6] Although the AHA data contain counts of medical residents, we instead used information from the Impact File because we believe it is the most complete and accurate source of information on medical residents available.

[7] These values are taken from the year 2000.

[8] The AAMC list was supplemented with a list of hospitals supplied by James Reuter of Georgetown University. After accounting for hospital mergers and closures, the final set of AHCs used in this analysis is nearly identical to the set used in Reuter, *The Financing of Academic Health Centers*, September 1997.

non-teaching hospital category provides an appropriate set of non-teaching hospitals as a comparison group. The 2000 AHA Annual Survey includes 4,915 community hospitals, of which 1,043 were large urban non-teaching hospitals.[9]

Data Sources

Financial data for the analysis came from two sources: the AHA's Annual Survey of Hospitals and the Hospital Cost Report Information System (HCRIS) Master File. Hospital revenue and cost information from the 1994 through 2000 AHA Annual Surveys were used to construct total and operating margins, payment-to-cost ratios, and measures of uncompensated care. Occupancy rates, average length of stay, number of admissions, and inpatient days were also obtained from the AHA data.

A number of hospitals included in the AHA survey either did not respond or did not provide all of the requested information. For key data elements, particularly the financial data, the AHA imputes values for non-responding hospitals using a regression approach. One limitation of this approach is that it does not factor in the location or teaching status of a hospital.[10] Therefore, the financial analysis of teaching and large urban non-teaching hospitals includes only information that was reported by these hospitals. The financial analysis of the all hospitals group, however, includes actual and imputed information for all community hospitals; this information matches other publicly available information produced using AHA data.[11] In addition, reported and imputed hospital data are used for the capacity and utilization analysis. Exhibit 2-1 shows the number of hospitals included in the analysis and the AHA survey response rate by type of hospital.

Medicare costs per case and total costs per adjusted discharge were measured using data from each hospital's cost report contained in HCRIS. Adjusted discharges were calculated by multiplying total inpatient discharges by the ratio of total hospital charges to total inpatient charges. The purpose of using adjusted discharges is to account for both inpatient and outpatient care. The cost analysis conducted in this study used Medicare cost report data based on fiscal year 1999 (FY99) data, also known as the sixteenth year of the Medicare Prospective Payment System (PPS16), and fiscal year 1998 (PPS15), fiscal year 1997 (PPS14), and fiscal year 1996 (PPS13). Analytic results are based on The Lewin

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[9] Our analysis only includes community hospitals identified in the AHA data. A community hospital is defined as a non-federal AHA-registered general medical facility located within the Unites States.

[10] Based on conversations with Peter Kralovec of AHA's Health Forum, a for-profit research group within the AHA that is responsible for the survey.

[11] The imputation approach used by AHA is likely to be more accurate when reporting outcomes for all hospitals, rather than for subsets of hospitals defined either by geographic area or hospital teaching status.

Group Efficiency Model. This model uses data from the Medicare Cost Report, the Area Resource File, and the Impact File.

Exhibit 2-1. Number of Hospitals (N) Included in the Analyses and Response Rates (%) Based on AHA Annual Survey Data

	1994		1995		1996		1997		1998		1999		2000	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
AHC	91	71%	98	77%	92	72%	95	78%	88	73%	99	83%	93	78%
Other Major	117	67%	135	76%	111	63%	123	66%	129	67%	119	65%	110	60%
Minor	588	67%	597	67%	569	66%	592	67%	536	60%	549	64%	527	63%
Large Urban Non-Teaching	815	67%	845	73%	795	69%	736	67%	722	68%	710	67%	678	65%
All	5,229	n/a	5,194	n/a	5,134	n/a	5,057	n/a	5,015	n/a	4,956	n/a	4,915	n/a

Financial results reported for AHC hospitals, Other Major, Minor, and Large Urban Non-Teaching are based on information from reporting hospitals only. Results for the All Hospitals category are based on reporting and non-reporting hospitals. For non-reporting hospitals, imputed values were used.

Source: The Lewin Group analysis of AHA Annual Survey data.

III. OVERVIEW OF ACADEMIC HEALTH CENTER HOSPITALS' FINANCIAL PERFORMANCE

This report provides an overview of the financial performance of AHC hospitals by examining trends in hospital margins among different types of hospitals. Total margins and operating margins are two commonly used measures of financial performance. Total margin is defined as the excess or deficiency of total net revenue over total expenses divided by total net revenue. It is the most comprehensive indicator of hospital financial performance because it measures the extent to which revenue from all sources (patient revenue as well as non-patient revenue) covers total hospital expenses. Operating margin measures the proportion of hospital operating costs that are covered by revenue generated from hospital operations. Ideally, operating margin would be defined as operating income or losses (i.e., net revenue minus non-operating revenue less operating hospital expenses) divided by total operating revenue. This formulation, however, is not possible with the AHA Annual Survey data because operating costs are not available. Thus our working definition of operating margin is total operating revenue less total expenses divided by total operating revenue. The difference between total and operating margins relates primarily to income from non-patient care activities, including investment income, the release of endowment assets, and the sale of other hospital assets. For these analyses, aggregate total and operating margins for each class of hospital discussed are presented.[12]

[12] Aggregate total margin was calculated by summing the total net revenue and expenses across all hospitals under consideration and then calculating a single total margin. Aggregate operating margin was calculated in a similar manner.

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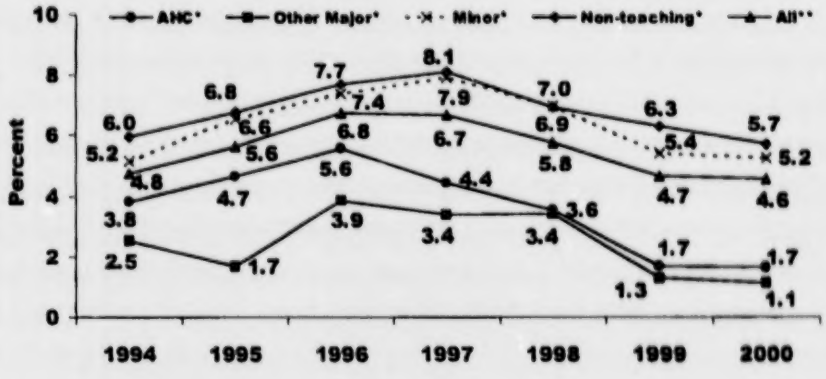
This overview of AHC hospitals' financial performance is intended to address the following questions:

1. How have AHC hospitals performed financially between 1994 and 2000?
2. Have AHC hospitals performed better or worse than the overall industry trend?

Trends in Aggregate Total Margins

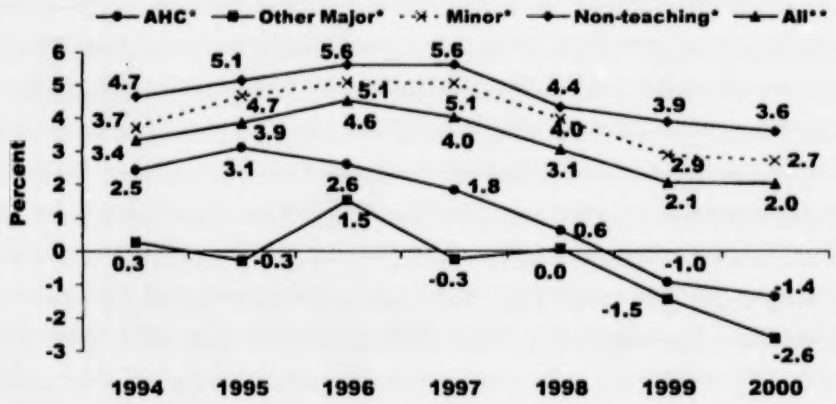
As shown in Exhibit 3-1, the aggregate total margins of all hospitals nationwide improved steadily between 1994 and 1996, increasing from about 4.8 percent to 6.8 percent, then declining to 4.6 percent in 2000. AHC hospitals' aggregate total margins began to fall sharply in 1996, while that of large urban non-teaching and minor teaching hospitals began to decrease a year later in 1997, though not as precipitously. By 1999, AHC and other major teaching hospitals' aggregate total margins were less than 2 percent. However, in 2000, aggregate total margins for AHC hospitals stabilized, whereas aggregate total margins for other major teaching hospitals continued to decline slightly. These data indicate that the decline in aggregate total margins for academic health centers started earlier and was sharper than the decline for large urban non-teaching hospitals and for all hospitals generally.

Exhibit 3-1. Trends in Aggregate Total Margins by Hospital Teaching Status, 1994–2000



Total Margin = (net revenue – hospital expenses)/net revenue.
Non-teaching hospitals include urban non-teaching hospitals with more than 100 beds.
* Includes reported community hospitals data only.
** Includes reported and imputed community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 3-2. Trends in Aggregate Operating Margins by Hospital Teaching Status, 1994–2000



Total Margin = (net revenue – hospital expenses)/net revenue.
Non-teaching hospitals include urban non-teaching hospitals with more than 100 beds.
* Includes reported community hospitals data only.
** Includes reported and imputed community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

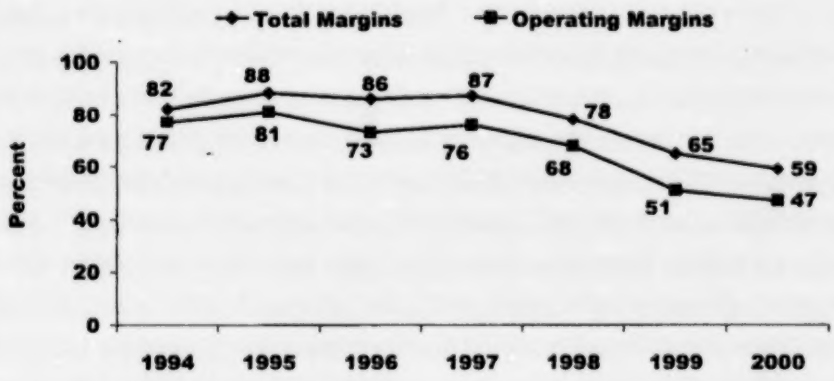
Trends in Aggregate Operating Margins

As shown in Exhibit 3-2, AHC hospitals and other major teaching hospitals showed lower aggregate operating margins than minor teaching and large urban non-teaching hospitals, with the disparity increasing since 1996. In 2000, AHC and other major teaching hospitals' aggregate operating margins were –1.4 percent and –2.6 percent, respectively. AHC hospitals and other major teaching hospitals' aggregate operating margins began to fall two years before those of large urban non-teaching and minor teaching hospitals. Thus, the decline in financial strength experienced by the entire industry in the late 1990s was stronger and evident earlier for AHC hospitals.

Trends in Proportion of Academic Health Center Hospitals with Positive Margins

Underlying the decline in aggregate total and operating margins was a reduction in the proportion of AHC hospitals with positive margins (Exhibit 3-3). In 1994, 82 percent of AHC hospitals had positive total margins. This proportion reached 88 percent in 1995, but declined in each following year (except 1997) and fell to 59 percent by 2000. The proportion of AHC hospitals with positive operating margins followed a similar pattern. In 1994, the proportion of AHC hospitals with positive operating margins was 77 percent. The proportion increased to 81 percent the following year. However, by 2000, less than half (47%) of AHC hospitals had positive operating margins.

Exhibit 3-3. Proportion of AHC Hospitals with Positive Margins, 1994–2000



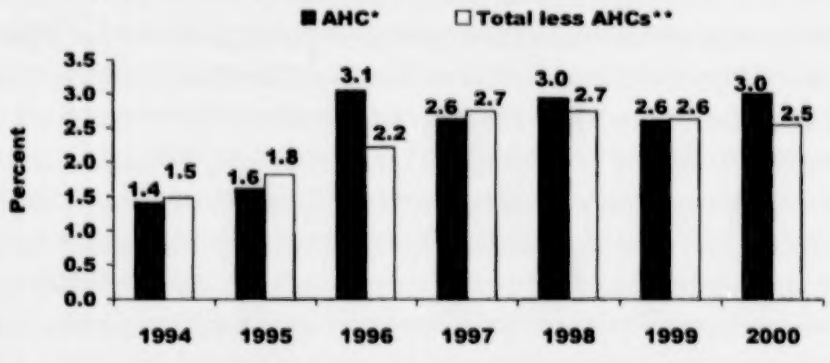
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Trends in Non-Operating Revenue

As can be inferred from Exhibits 3-1 and 3-2, non-operating revenue was the sole source of positive total margins for AHC hospitals. By comparison, non-teaching and minor teaching hospitals were able to cover their costs with operating revenue only.

Exhibit 3-4 shows that non-operating revenue as a proportion of total revenue for AHC hospitals more than doubled between 1994 and 1996, increasing from 1.4 percent to 3.1 percent. Thereafter, it varied between 2.6 and 3.0 percent. This suggests that AHC hospitals have been compensating for operational losses with non-operating sources of revenue, including income from investments, endowments, and contingency reserve funds. The increase in the proportion of non-operating revenue corresponds to the period 1996 to 2000, when AHC hospitals experienced a decline in total and operating margins. This phenomenon might be due to several factors. First, academic health centers could have placed added emphasis on acquiring revenue from non-patient care sources. Second, the returns on investments might have increased substantially in the last three years due to the gains in the financial market. Finally, the decrease in patient care revenue might have increased the proportion of non-operating revenue.

Exhibit 3-4. Trends in Proportion of Non-Operating Revenue by Hospital Teaching Status, 1994–2000



* Includes reported community hospital data only.
** Total less AHCs includes reported and imputed community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

This study indicates that the financial status of AHC hospitals has declined since 1996. The trend in financial performance exhibited by AHC hospitals is not sustainable; it does not provide adequate net income to enable modernization, acquisition of new technology, maintenance, expansion of community programs, and the funding of contingency and other reserves.

IV. ANALYSIS OF HOSPITAL PAYMENTS AND COSTS

The purpose of this section is to identify the underlying factors that have contributed to the declining financial performance of AHC hospitals. Hospital financial performance, as measured by margins (discussed in the previous section), is driven by changes in payments and costs. Overall reductions in payment levels, reliance on relatively poor payers, rising costs, and increases in levels of uncompensated care can all contribute to a decline in financial performance.

This section examines individual payer payments (e.g., private payer, Medicare, and Medicaid) relative to costs. Payment-to-cost ratios measure the amount of payment received by a provider per dollar of cost of treating the patient. These ratios are presented in percentage terms. A payment-to-cost ratio of 110 percent suggests that payments are 110 percent of costs, meaning that, for every dollar of cost a hospital incurs, it receives $1.10 in payments. Payment-to-cost ratios are based on data from the AHA Annual

Survey.[13] This section compares trends in payment-to-cost ratios and payer mix for AHC hospitals with other types of hospitals. It then shows levels of uncompensated care provided by AHC hospitals and other types of hospitals. The section concludes with a discussion of hospital costs and efficiency.

Trends in Payment-to-Cost Ratios for Academic Health Center Hospitals

As shown in Exhibit 4-1, the private payer payment-to-cost ratio for AHC hospitals has fallen markedly since 1996, declining by 15.9 percentage points, from 128.4 percent in 1996 to 112.5 percent in 2000. Between 1994 and 2000, the private payer payment-to-cost ratio declined by 11.7 percentage points. During the same period, Medicare payment-to-cost ratios initially increased slightly, from 98.1 percent in 1994 to 107.5 percent in 1997, but decreased thereafter, reaching 99.9 percent in 2000. The decrease in the Medicare payment-to-cost ratio from 1997 to 2000 was due, in part, to implementation of the Balanced Budget Act of 1997 (BBA). It is interesting to note, however, that even after the BBA, the Medicare payment-to-cost ratio was higher in 2000 than in 1994. The Medicaid payment-to-cost ratio increased from 94.9 percent in 1994 to 98.5 percent in 1999, probably due to increases in disproportionate share payments. However, the Medicaid payment-to-cost ratio decreased to 95.7 percent in 2000.

[13] AHA data include net patient revenue and gross charges for each payer type. Net patient revenue is defined as gross charges, less contractual allowances. The data also include total hospital expenses, from which we have excluded bad debt expenses. To estimate the costs incurred for treating a patient, we compute a hospital-specific ratio of cost to charges (RCC). The RCC is then multiplied by the gross charges for each payer, which yields a level of cost. The computed cost is compared with net patient revenue to produce a payment-to-cost ratio.

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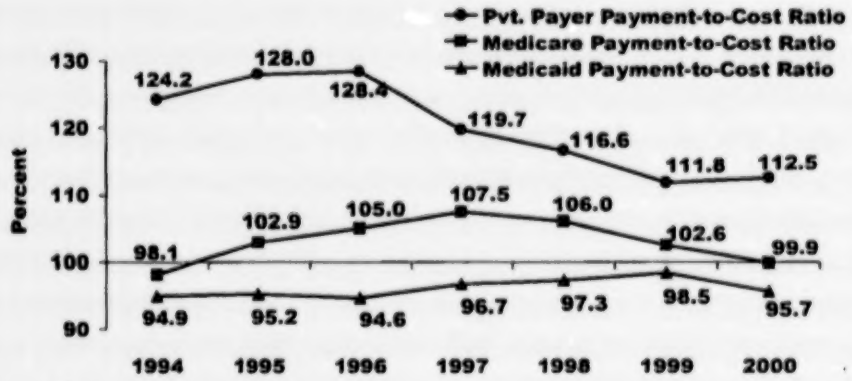
Exhibit 4-1. Trends in Payment-to-Cost Ratios by Payer for AHCs, 1994–2000



Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

By comparison, the private payer payment-to-cost ratio for all U.S. hospitals fell from 124.5 percent in 1994 to 115.7 percent in 2000, a difference of 8.8 percentage points (results not shown in Exhibit 4-1). Medicare and Medicaid payment-to-cost ratios have not changed substantially since 1996 for all U.S. hospitals. In 2000, the Medicare and Medicaid payment-to-cost ratios for all U.S. hospitals (99.1% and 94.5%, respectively) were lower than those of AHC hospitals.

The authors compared trends in payment-to-cost ratios between 1994 and 2000 for four different types of hospitals: academic health center hospitals, other major teaching hospitals, minor teaching hospitals, and large urban non-teaching hospitals.

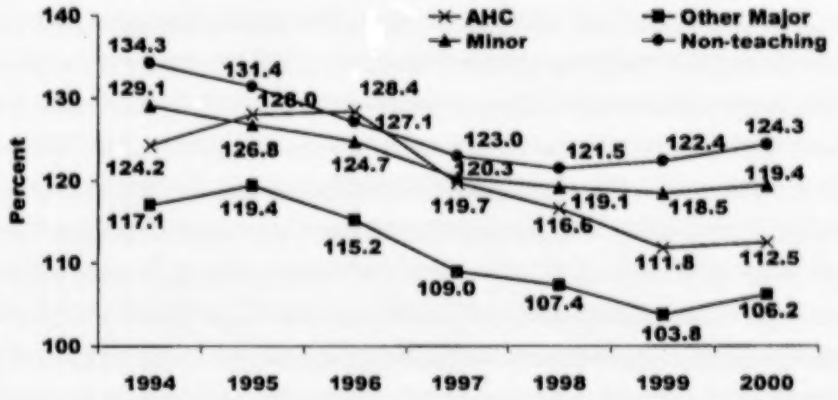
Private Payer Payment-to-Cost Ratio

A comparative analysis of private payer payment-to-cost ratios between 1994 and 2000 demonstrated the following (Exhibit 4-2):

- Academic health center hospitals and other major teaching hospitals experienced the sharpest percentage point decline (11.7 and 10.9 percentage points, respectively) in private payer payment-to-cost ratios compared with other types of hospitals.

- In 2000, other major teaching hospitals had the lowest private payer payment-to-cost ratio (106.2%), followed by academic health centers (112.5%). Large urban non-teaching hospitals had the highest payment-to-cost ratio (124.3%) compared with other types of hospitals.
- The disparity in private payer payment-to-cost ratios between AHC hospitals and large urban non-teaching hospitals has not been constant over time. In 1994, the disparity was 10.1 percentage points. In 1995, it was 3.4 percentage points; in 2000, it was 11.8 percentage points.
- Private payers have so significantly reduced payments relative to costs to AHC hospitals that they underpay AHC hospitals in comparison to most other hospitals. In some states, private payers may not even cover the cost of AHC hospitals' patient care.

Exhibit 4-2. Trends in Private Payer Payment-to-Cost Ratios by Type of Hospital, 1994–2000



Includes reported community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

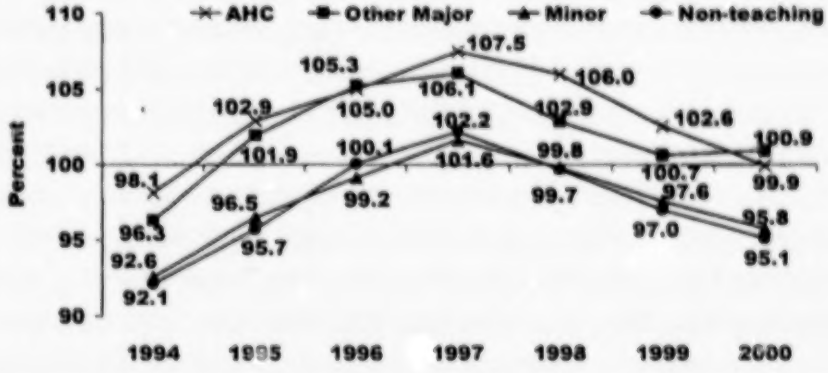
Medicare Payment-to-Cost Ratio

An examination of the Medicare payment-to-cost ratios reveals the following (Exhibit 4-3):

- Despite the Balanced Budget Act of 1997, Medicare payment-to-cost ratios have increased by an average of three percentage points since 1994 for all types of hospitals, except AHC hospitals.

- In 2000, other major teaching hospitals had the highest Medicare payment-to-cost ratio (100.9%) compared with other types of hospitals.

Exhibit 4-3. Trends in Medicare Payment-to-Cost Ratios by Type of Hospital, 1994–2000



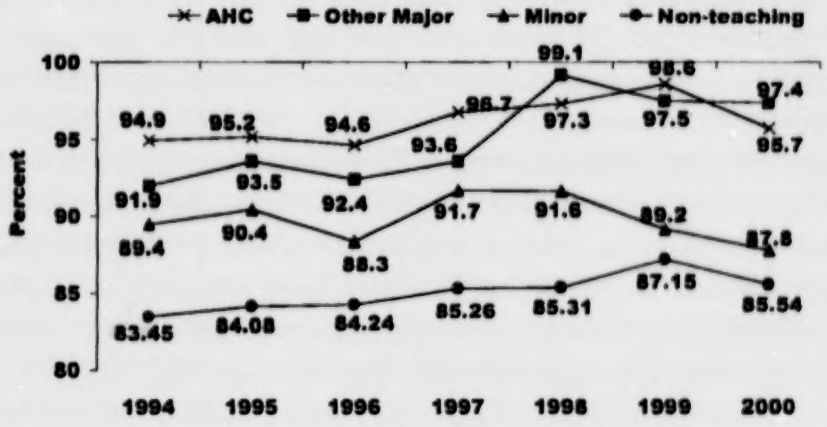
Includes reported community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Medicaid Payment-to-Cost Ratio

Medicaid payment-to-cost ratios differed among all types of hospitals. This study revealed the following (Exhibit 4-4):

- Medicaid payment-to-cost ratios have not followed a consistent trend, but generally have increased from their 1994 levels.
- In 2000, other major teaching hospitals had the highest Medicaid payment-to-cost ratio (97.4%) compared with other types of hospitals. The spread in the Medicaid payment-to-cost ratios is particularly noticeable between AHC hospitals and large urban non-teaching hospitals (a difference of 10.2 percentage points).
- Medicaid payment-to-cost ratios increased between 1994 and 2000 for AHC hospitals, other major teaching hospitals, and large urban non-teaching hospitals. The ratios for AHC hospitals and large urban non-teaching hospitals increased by approximately one percentage point. The ratio for other major teaching hospitals increased by almost six percentage points. Medicaid payment-to-cost ratios decreased for minor teaching hospitals.

Exhibit 4-4. Trends in Medicaid Payment-to-Cost Ratios by Type of Hospital, 1994–2000



Includes reported community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

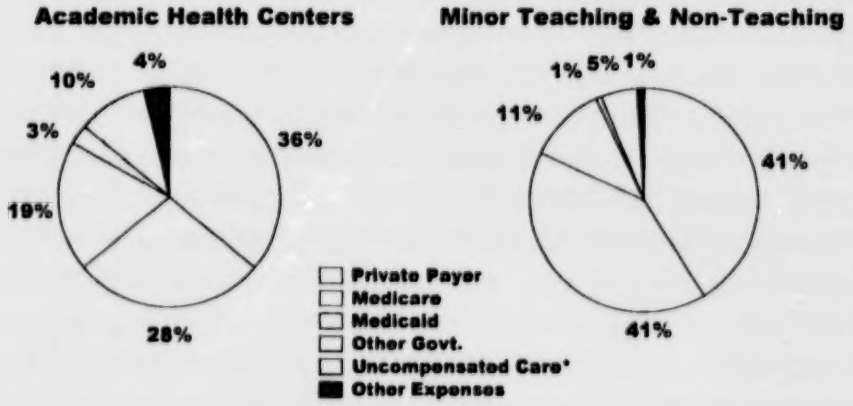
Comparison of Payer Mix: 2000

This study also compared the payer mix (based on hospital cost) between AHC hospitals and large urban non-teaching hospitals to examine the relative impact of changes in payment-to-cost ratios. For example, a hospital that generates a large percentage of its revenue from Medicaid costs would be more affected by decreases in the Medicaid payment-to-cost ratio than a hospital that generates a small share of its revenue from Medicaid.

In comparison with large urban non-teaching hospitals, AHC hospitals had a higher percentage of total costs based on Medicaid and a lower percentage of total costs based on payments from private payers and Medicare (Exhibit 4-5). AHC hospitals also had a higher proportion of gross uncompensated care than other hospitals.[14] This suggests that AHC hospital finances were affected by declining Medicaid payment-to-cost ratios to a greater degree than large urban non-teaching hospitals.

[14] For the purpose of showing the distribution of hospital costs, gross uncompensated care is shown in Exhibit 4.5. Gross uncompensated care consists of bad debt and charity care charges converted to costs by a hospital-specific ratio of costs to charges.

Exhibit 4-5. Composition of Hospital Cost by Hospital Type for 2000



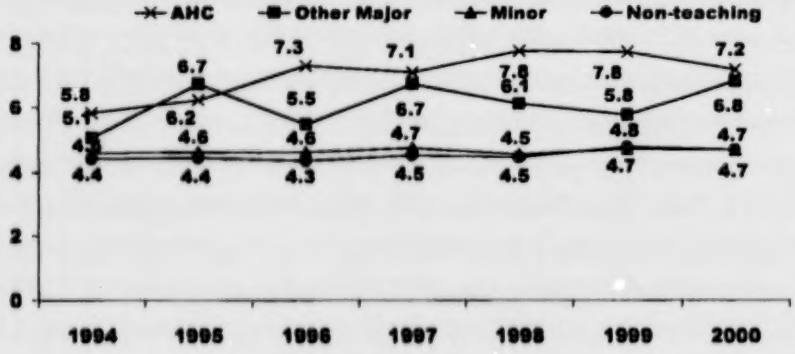
Includes reported community hospital data only.
* Uncompensated care cost consists of the sum of bad debt and charity care charges converted to costs by a hospital-specific ratio of costs to charges.
Source: The Lewin Group analysis of 2000 AHA Annual Survey data.

Trends in Uncompensated Care for Academic Health Center Hospitals Compared with Other Types of Hospitals

In this section, the authors report uncompensated care burdens and trends in these levels for AHC hospitals and other types of hospitals. Uncompensated care is equal to gross uncompensated care (i.e., bad debt and charity care costs) minus the tax allowances for bad debt and charity care.[15] In 2000, uncompensated care constituted 7.2 percent of the cost of AHC hospitals (Exhibit 4-6). AHC hospitals carry about three percentage points more uncompensated care as a percentage of cost than large urban non-teaching hospitals. Uncompensated care at AHC hospitals has been increasing faster than uncompensated care at other types of hospitals. AHC hospitals not only had the highest level of uncompensated care in 2000, but the level of uncompensated care has grown by almost two percentage points from 1994 to 2000. The level of uncompensated care decreased slightly for AHC hospitals from 1998 to 2000. For other types of U.S. hospitals, the level of uncompensated care has increased by less than one percentage point between 1994 and 2000. Increases in uncompensated care and decreases in private payer payment-to-cost ratios are the primary factors underlying the increasingly poor financial performance of academic health center hospitals.

[15] Uncompensated care cost consists of the sum of bad debt and charity care charges converted to costs by a hospital-specific ratio of costs to charges minus the tax allowances for bad debt and charity care.

Exhibit 4-6. Trends in Uncompensated Care* as a Percent of Cost by Hospital Teaching Status, 1994–2000



* Uncompensated care cost consists of the sum of bad debt and charity care charges converted to costs by a hospital-specific ratio of costs to charges minus the tax allowances for bad debt and charity care.
Includes reported community hospital data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Cost-Shifting

Cost-shifting is common within the health care industry. In hospital settings, cost-shifting occurs when providers recover the unpaid cost of care delivered to one or more payer-specific patient populations through financial surpluses derived from treating other, more highly reimbursed, payer populations. Historically, the most common causes of hospital cost-shifting have been low reimbursement levels by Medicaid and uncompensated care losses. Medicaid accounted for slightly more than 19 percent of costs for academic health center hospitals (Exhibit 4-5). Academic health center hospitals received slightly more than 95 percent of the costs they incurred in treating the Medicaid population (Exhibit 4-1). The financial losses incurred by hospitals from the provision of care to the Medicaid population as well as uncompensated care have historically been subsidized by income generated from treating privately insured and, in some years, Medicare patients.

Medicare and privately insured patients constituted the majority of costs (63.5% of hospital costs) for academic health center hospitals (Exhibit 4-5). AHC hospitals show a private payer payment-to-cost ratio of 112.5 percent in 2000 (Exhibit 4-1). This represents a significant reduction from the 1994 level. For large urban non-teaching hospitals, the relatively robust surplus of private payer revenue over cost (Exhibit 4-2) can compensate for hospital losses from other payers to a much greater extent than for AHC hospitals. Furthermore, Medicare payments to AHC hospitals were just offsetting costs in

2000. AHC hospitals thus needed to cover Medicaid and uncompensated care losses with relatively smaller financial surpluses generated from private payers.

Analysis of Hospital Costs and Efficiency

Payments and costs are the basic determinants of a hospital's financial performance. In some instances (i.e., Medicare payments), payment levels are set prospectively and cannot be significantly altered by individual hospitals. On the other hand, hospitals can usually affect their financial performance by modifying their cost structures. Therefore, a discussion of hospital financial performance must consider hospital costs.

To compare the costs of academic health centers and major teaching hospitals to those of other hospitals, the authors constructed three measures of cost: Medicare inpatient cost per case (i.e., discharge); case-mix adjusted Medicare inpatient cost per case; and all-payer cost per adjusted discharge. These cost variants are based on Medicare hospital cost report data for fiscal years 1996 to 1999 and exclude the costs associated with direct medical education (DME).

Each cost measure is shown in Exhibit 4-7. The first set of costs reflects Medicare cost per case (excluding DME) for inpatient services only. This analysis indicates that 1999 Medicare inpatient cost per case is higher for AHC hospitals ($10,656) and major teaching hospitals ($8,482) than for large urban non-teaching ($5,603) hospitals. The relatively high cost of AHC hospitals and other major teaching hospitals is a result, in part, of their treating complex cases using sophisticated patient care services and engaging in other mission-related activities. The data also indicate that Medicare inpatient cost per case has declined by almost 1 percent for AHC hospitals and by almost 2 percent for major teaching hospitals from 1996 to 1998. However, Medicare inpatient cost increased from 1998 to 1999 for all hospital types, particularly AHC hospitals (4.9%).

To reduce the effects of patient mix on cost, the authors divided the Medicare inpatient cost per case by the Medicare case-mix index (CMI). This standardizes Medicare costs for variations in case-mix across hospital types and over time. Compared with the analysis of the unadjusted Medicare cost per case, the results show much smaller differences in cost per case for AHC hospitals and other types of hospitals once case-mix differences are accounted for. In addition, although AHC hospitals have higher costs than large urban non-teaching hospitals, their rate of increase in cost per case was still slower after adjusting for case-mix differences.

Finally, this analysis looked at total cost per adjusted discharge across all payers (e.g., Medicare, Medicaid, and private). Total costs reflect costs associated with inpatient and outpatient care. The authors adjusted the number of discharges to account for outpatient volume by multiplying inpatient discharges by the ratio of total hospital charges to inpatient charges. The results indicate that, while costs increased between 1996 and 1999 for all hospital types, the increase was particularly pronounced for AHC hospitals. This change may be to due to a growing case-mix or to increases in outpatient care.

Exhibit 4-7. Comparison of Costs by Hospital Teaching Status, 1996–1999

Medicare Inpatient Costs per Case (Excludes DME)					
	1996	1997	1998	1999	Change 1996–1999
Non-Teaching	$5,351	$5,374	$5,486	$5,603	4.7%
Minor Teaching	$6,864	$6,822	$6,957	$7,007	2.1%
Major Teaching	$8,337	$8,296	$8,234	$8,482	1.7%
AHC	$10,154	$10,056	$10,147	$10,656	4.9%

Case-Mix Adjusted Medicare Inpatient Cost per Case (Excludes DME)					
	1996	1997	1998	1999	Change 1996–1999
Non-Teaching	$3,991	$4,013	$4,118	$4,224	5.8%
Minor Teaching	$4,362	$4,343	$4,437	$4,493	3.0%
Major Teaching	$5,292	$5,227	$5,298	$5,360	1.3%
AHC	$5,610	$5,504	$5,653	$5,867	4.6%

Cost per Adjusted Discharge (Excludes DME)					
	1996	1997	1998	1999	Change 1996–1999
Non-Teaching	$5,194	$5,328	$5,381	$5,384	3.7%
Minor Teaching	$6,334	$6,474	$6,577	$6,653	5.0%
Major Teaching	$8,049	$8,225	$8,468	$8,765	8.9%
AHC	$10,322	$10,830	$11,248	$11,019	6.8%

Source: The Lewin Group analysis based on hospital Medicare cost report data (PPS13–PPS16).

Although direct comparisons of costs across hospital types are useful, any conclusions about hospital efficiency drawn from this information must be carefully considered because of differences in other cost-related factors. For example, variations in costs across hospital types may reflect the impact of teaching on patient care costs or differences in case-mix and labor costs. To get a better sense of the relative efficiency of teaching hospitals, the authors used The Lewin Group Efficiency Model to produce estimates of "expected" Medicare inpatient and all-payer costs per case.[16] Expected cost per case represents the cost a hospital with a given set of characteristics would be expected

[16] All-payer cost per case is roughly equivalent to cost per adjusted discharge.

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on average to incur. A hospital is considered efficient if its actual cost per case is less than its expected cost per case.[17] The Appendix provides a more detailed description of The Lewin Group Efficiency Model.

The efficiency model based on Medicare inpatient cost (less DME) indicates that AHC hospitals were slightly inefficient relative to other types of hospitals, while major teaching hospitals were efficient relative to other hospital types (Exhibit 4-8). Similar results were found for the all-payer cost per case (less DME) model. Although the findings suggest that AHC hospitals are inefficient, they indicate much smaller differences than the differences found in the comparison of cost per case. In addition, the efficiency results may relate more to the underlying complexity of AHC hospitals than to inherent inefficiency.

Exhibit 4-8. Comparison of Efficiency* by Hospital Teaching Status, 1996–1999

Cost Efficiency Model: Medicare Inpatient (Excludes DME)					
	1996	1997	1998	1999	Change 1996–1999
Non-Teaching	1.000	0.999	1.000	1.005	0.45%
Minor Teaching	0.996	0.997	0.997	0.990	–0.60%
Major Teaching	0.983	0.985	0.983	0.980	–0.27%
AHC	1.027	1.017	1.027	1.034	0.70%

Cost Efficiency Model: All Payer Costs (Excludes DME)					
	1996	1997	1998	1999	Change 1996–1999
Non-Teaching	1.001	1.001	1.000	1.001	0.02%
Minor Teaching	0.992	0.993	0.992	0.995	0.28%
Major Teaching	0.963	0.956	0.962	0.979	1.71%
AHC	1.043	1.044	1.052	1.028	–1.41%

* Efficiency index > 1 indicates hospitals that are relatively inefficient.
Efficiency index < 1 indicates hospitals that are relatively efficient.
Efficiency index = 1 indicates the average efficiency level of U.S. hospitals.

Source: The Lewin Group analysis based on hospital Medicare cost report data (PPS13–PPS16).

Although, overall, AHC hospitals were found to be inefficient, some individual AHC hospitals were efficient according to the model. This study examined the efficiency of AHC hospitals in the District of Columbia and the 11 states with the greatest number of such hospitals: California, Massachusetts, Michigan, New York, North Carolina, Illinois, Missouri, Ohio, Florida, Pennsylvania, and Texas. In five of these states, AHC

[17] Our efficiency results depend on the set of characteristics used to determine an expected cost per case. The Medicare model uses the Medicare case-mix index, wage index, urban/rural status, disproportionate share, intern- and resident-to-bed ratio, outliers, total beds, and area income and population measures. For the all-payer model, specialty care days are added to provide additional controls for case-mix.

hospitals were efficient overall based on the all-payer model. Using the Medicare model, AHC hospitals in three states (Massachusetts, Ohio, and Pennsylvania) were efficient overall (results not shown).

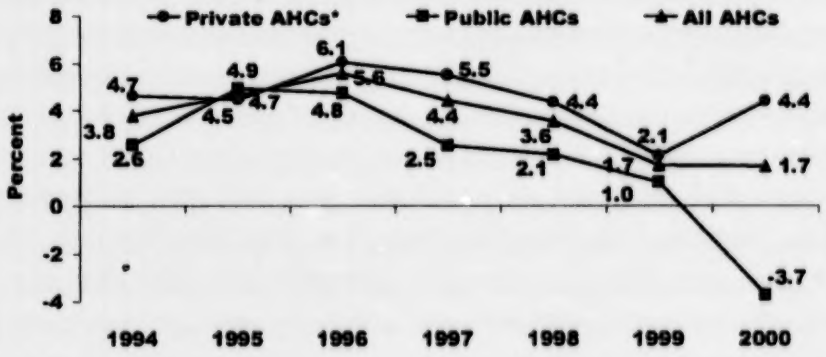
V. PUBLIC AND PRIVATE ACADEMIC HEALTH CENTER HOSPITALS

In keeping with their mission statements, AHC hospitals, particularly public AHC hospitals, are committed to providing health care to the poor. This section contrasts the financial performance of public and private AHC hospitals in the United States to determine if public AHC hospitals are in a different financial situation than private AHC hospitals. For this analysis, private AHC hospitals include those institutions operating on a for-profit and not-for-profit basis. This analysis included 37 public AHC hospitals and 56 private AHC hospitals in 2000.

Between 1994 and 2000 (except in 1995), public AHC hospitals had a lower aggregate total margin than private AHC hospitals (Exhibit 5-1). The aggregate total margin for private AHC hospitals remained fairly steady in 1994 and 1995, increased sharply in 1996 to 6.1 percent, began a steep decline that continued through 1999, and then rose in 2000 to 4.4 percent. Public AHC hospitals in general were about one year ahead of private AHC hospitals in terms of changes in the aggregate total margin; the margin increased sharply in 1995, and then began a steady decline between 1996 and 1999. The aggregate total margin in 2000 for public AHC hospitals was –3.7 percent, while the aggregate total margin for private AHC hospitals was 4.4 percent.

The precipitous decline in public AHC total margins is due to a rapid rise in reported average cost per admission; between 1999 and 2000, average cost per admission increased by 8.6 percent, while revenue only increased by 3.7 percent per admission. The payment-to-cost ratios for Medicare, Medicaid, and private payers all decreased between 1999 and 2000, with the largest fall occurring in private payer payment-to-cost ratios, which fell from 137.1 percent to 109.5 percent.

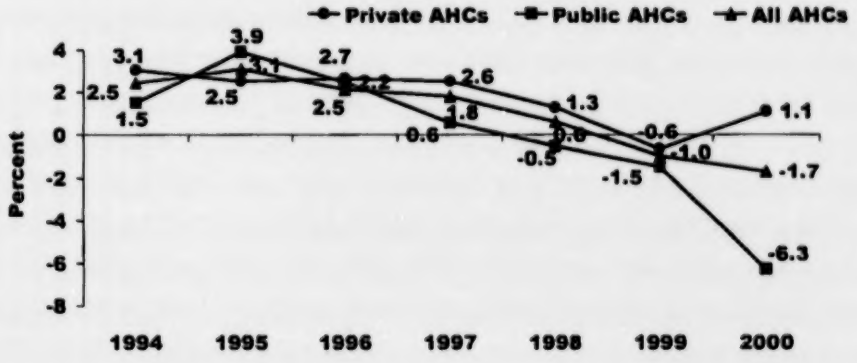
Exhibit 5-1. Trends in AHC Aggregate Total Margin by Ownership Status, 1994–2000



Total Margin = (net revenue – hospital expenses)/net revenue.
Includes reported community hospitals data only.
* Private AHCs include not-for-profit and for-profit AHCs.
Source: The Lewin Group analysis of AHA Annual Survey data.

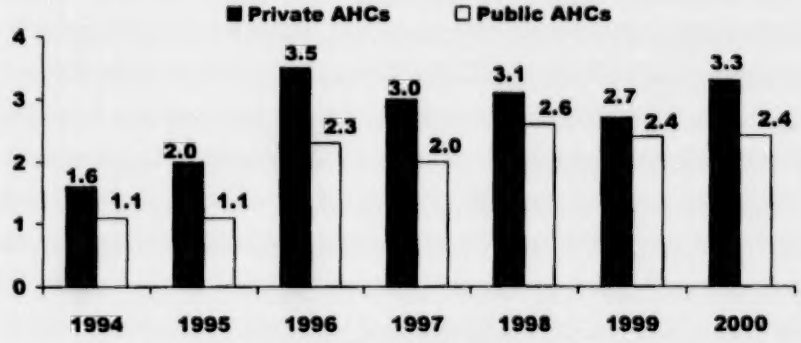
Exhibit 5–2 presents trends in the aggregate operating margin for public and private AHC hospitals. In 1994, public AHC hospitals had a lower aggregate operating margin than private AHC hospitals. Public AHC hospitals' aggregate operating margin sharply increased in 1995 to 3.9 percent, then began a steep and steady decline to –1.5 percent in 1999. Between 1994 and 2000 (except in 1995), private AHC hospitals had consistently higher aggregate operating margins than public AHC hospitals. By 1999, both public and private AHC hospitals exhibited negative aggregate operating margins, but in 2000, the aggregate operating margin for public AHC hospitals declined sharply to –6.3 percent, while the aggregate operating margin for private AHC hospitals increased to 1.1 percent.

Exhibit 5-2. Trends in AHC Aggregate Operating Margins by Ownership Status, 1994–2000



Operating Margin = (net revenue – non-operating revenue – hospital expenses)/(net revenue – non-operating revenue).
Private AHCs include not-for-profit and for-profit AHCs.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 5-3. Trends in Percent of Non-Operating Revenue for AHC Hospitals by Ownership Status, 1994–2000



Private AHC hospitals include not-for-profit and for-profit hospitals.
Source: The Lewin Group analysis of AHA Annual Survey data.

Between 1994 and 2000, private AHC hospitals had a higher percentage of non-operating revenue than public AHC hospitals (Exhibit 5-3). The percent of non-operating revenue for public AHC hospitals remained steady, at 1.1 percent, during 1994 and 1995,

increased to 2.3 percent in 1996, peaked at 2.6 percent in 1998, then decreased to 2.4 percent in 1999 and 2000. For private AHC hospitals, the percent of non-operating revenue peaked at 3.5 percent in 1996, decreased to 2.7 percent in 1999, then increased to 3.3 percent in 2000.

Exhibit 5-4 compares margins, payments, and costs of private and public AHC hospitals for the year 2000. Notably, although public AHC hospitals showed lower margins than private AHC hospitals, their Medicaid and private payer payment-to-cost ratios were higher than private AHC hospitals. The Medicare payment-to-cost ratio for public AHC hospitals was 96.9 percent, compared with 101.1 percent for private AHC hospitals. The Medicaid payment-to-cost ratio for public AHC hospitals was 99.2 percent, compared with 92.1 percent for private AHC hospitals. This difference is most likely due to higher disproportionate share payments for public AHC hospitals. A key finding is that public AHC hospitals have a much higher percentage of uncompensated care costs, after tax allowances, as a percentage of total costs than private AHC hospitals (10.3% vs. 5.5%).

Exhibit 5-4. Comparison of Private* and Public AHC Hospitals for 2000

	Private AHCs	Public AHCs
Total Margin	4.4%	–3.7%
Operating Margin	1.1%	–6.3%
Medicare Payment-to-Cost Ratio	101.1%	96.9%
Medicare Costs as a Percent of Total	31.5%	21.2%
Medicaid Payment-to-Cost Ratio	92.1%	99.2%
Medicaid Costs as a Percent of Total	14.8%	27.4%
Private Payer Payment-to-Cost Ratio	108.8%	109.5%
Private Payer Costs as a Percent of Total	43.0%	29.5%
Other Govt. Payment-to-Cost Ratio	108.7%	45.5%
Other Govt. Costs as a Percent of Total	1.1%	7.0%
Uncompensated Care Costs as a Percentage of Total	5.5%	10.3%

* Private hospitals include not-for-profit and for-profit hospitals.

Source: The Lewin Group analysis of AHA Annual Survey data.

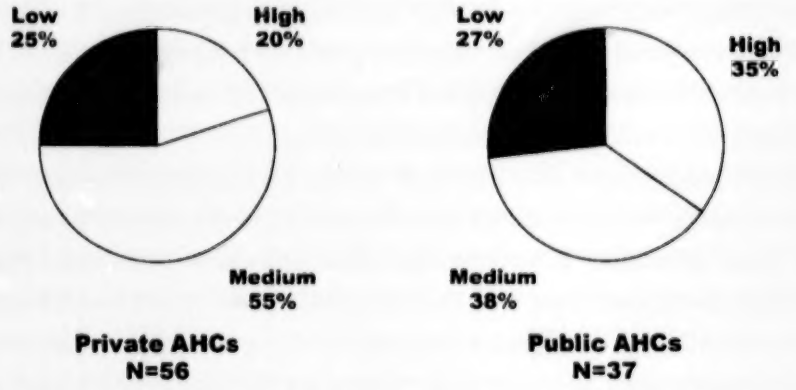
To determine the extent to which ownership status corresponds to the level of uncompensated care provided by an AHC hospital, the authors compared the levels of uncompensated care in private and public AHC hospitals. AHC hospitals were considered high providers of uncompensated care if their uncompensated care levels fell in the top quartile of all AHC hospitals.[18] They were considered low providers of uncompensated care if their uncompensated care levels fell in the bottom quartile of all AHC hospitals.[19]

[18] Top quartile refers to AHC hospitals with levels of uncompensated care that are above the 75th percentile.

[19] Bottom quartile refers to AHC hospitals with levels of uncompensated care that are at or below the 25th percentile.

As shown in Exhibit 5-5, 35 percent of public AHC hospitals provided high levels of uncompensated care, compared with 20 percent of private AHC hospitals.

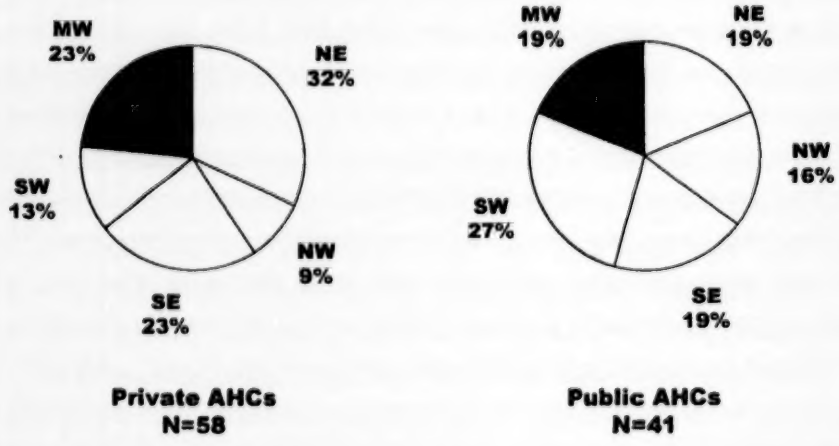
Exhibit 5-5. Levels of Uncompensated Care* by Ownership Status for 2000



* Uncompensated care is measured relative to total hospital expenses. AHCs were considered high providers of uncompensated care if their level of uncompensated care fell in the top quartile of all AHCs. AHCs were considered low providers if their level of uncompensated care fell in the bottom quartile of all AHCs.

Source: The Lewin Group analysis of 2000 AHA Annual Survey data.

Exhibit 5-6. Regional Distribution of AHCs by Ownership Status for 2000



Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 5-6 presents regional differences in the ownership status of AHC hospitals. The highest percentage of public AHC hospitals are located in the Southwest, while a higher percentage of private AHC hospitals are located in the Northeast, Southeast, and Midwest.

Exhibit 5-7 shows efficiency results by ownership type. The analysis was based on Hospital Cost Report Information System Master File for 1999. Both private and public AHC hospitals were inefficient in the Medicare and all-payer models.

Exhibit 5-7. Cost Efficiency Analysis of AHC Hospitals by Ownership Status for 1999

Ownership Status	Number of AHCs	Medicare		All-Payer	
		% Efficient	Efficiency Index	% Efficient	Efficiency Index
Public	39	50%	1.073	30%	1.009
Private	61	40%	1.021	40%	1.037

Source: The Lewin Group analysis based on hospital Medicare cost report data (PPS16).

VI. MARKET IMPACT OF MANAGED CARE

With the emergence of managed care, the nation's teaching hospitals faced the prospect of losing patients as cost-conscious payers directed individuals to less expensive health care facilities. In order to understand the impact of managed care on AHC hospitals, the authors examined the financial performance of AHC hospitals by level of managed care penetration for the years 1995 to 2000.[20] AHC hospitals located in a market where the managed care penetration rate in a given year fell in the bottom quartile of managed care penetration rates for all markets were classified as "low managed care" hospitals. Similarly, those located in a market where the managed care penetration rate for all AHC hospitals in a given year fell in the top quartile of managed care penetration rates were classified as "high managed care" hospitals. "Medium managed care" hospitals are those located in a market where managed care penetration rates fell in the inter-quartile range. About half the AHC hospitals were classified as "medium managed care," one-quarter as "high managed care," and the rest as "low managed care."

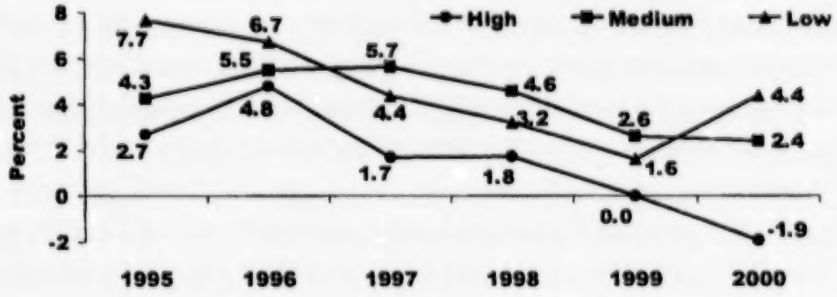
Trends in the Financial Performance and Level of Managed Care Penetration

Between 1995 and 2000, AHC hospitals in areas with low managed care penetration had a higher aggregate total margin than AHC hospitals in areas with medium or high levels of managed care penetration (Exhibit 6-1). In 1995, AHC hospitals in areas with low

[20] For these analyses, managed care penetration was defined by the Metropolitan Statistical Area HMO penetration rate as reported in various years of the *InterStudy Competitive Edge Part III: Regional Market Analyses Publications*. Data were not available for 1994.

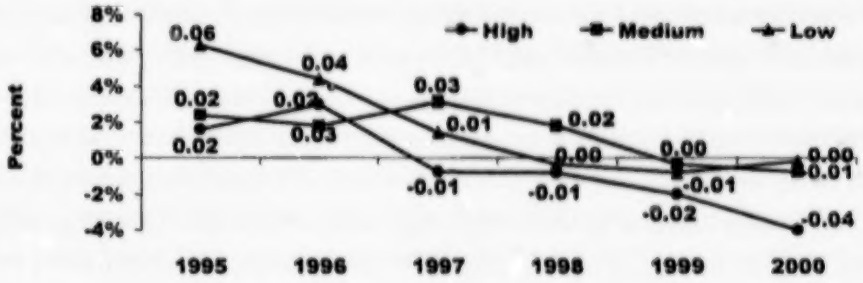
managed care penetration had the highest aggregate total margin (7.7%), followed by those in medium and high managed care penetration areas (4.3% and 2.7%, respectively). By 2000, AHC hospitals in areas with low managed care penetration had the highest aggregate total margin, followed by those in areas with medium managed care penetration. In 2000, AHC hospitals in areas with high managed care penetration had the lowest aggregate total margin (–1.9%).

Exhibit 6-1. Trends in Aggregate Total Margin by Level of Managed Care Penetration* for AHCs, 1995–2000



Total Margin = (net revenue – hospital expenses)/net revenue.
* Managed care penetration is defined by the HMO penetration rate. Low managed care penetration hospitals include AHCs that fell in the bottom quartile of HMO penetration in each year. High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 6-2. Trends in Aggregate Operating Margin by Level of Managed Care Penetration* for AHCs, 1995–2000



Operating Margin = (net revenue – non-operating revenue – hospital expenses)/(net revenue – non-operating revenue).

* Managed care penetration is defined by the HMO penetration rate. Low managed care penetration hospitals include AHCs that fell in the bottom quartile of HMO penetration in each year. High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.

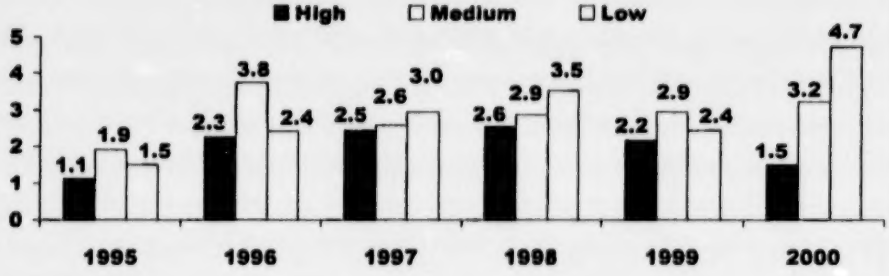
Includes reported community hospitals data only.

Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 6-2 shows trends in aggregate operating margins by level of managed care penetration for AHC hospitals between 1995 and 2000. In 1995, AHC hospitals with the lowest levels of managed care penetration had a higher aggregate operating margin, as compared with AHC hospitals in areas with medium and high managed care penetration. In 1995, all AHC hospital categories had positive aggregate operating margins. By 1999 and continuing through 2000, however, all three AHC hospital groups had non-positive aggregate operating margins, and those in areas with high managed care penetration had a lower aggregate operating margin. AHC hospitals in areas with low managed care penetration performed the best in terms of aggregate operating margin.

Between 1995 and 2000, AHC hospitals in areas of high managed care penetration consistently had the lowest percentages of non-operating revenue, compared with AHC hospitals in areas with medium and low levels of managed care penetration. In 2000, AHC hospitals in areas with low levels of managed care penetration had the highest percentage of non-operating revenue. This indicates that some of the financial strength of AHC hospitals in areas with low levels of managed care penetration could be due to a relatively high proportion of non-operating revenue (Exhibit 6-3).

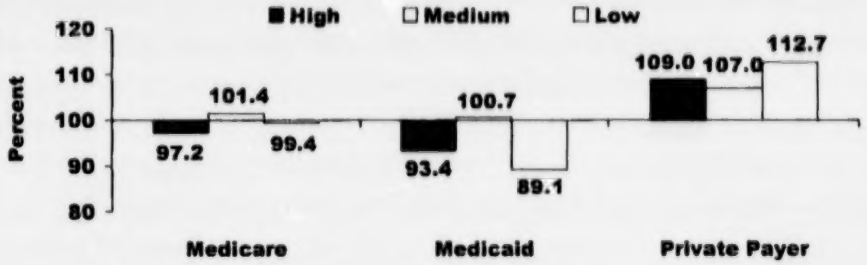
Exhibit 6-3. Trends in Percent of Non-Operating Revenue by Level of Managed Care Penetration* for AHCs, 1995–2000



* Managed care penetration is defined by the HMO penetration rate.
Low managed care penetration hospitals include AHCs that fell in the bottom quartile of HMO penetration in each year.
High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

The authors examined the payment-to-cost ratios in 2000 for AHC hospitals in areas with high, medium, and low managed care penetration (Exhibit 6-4). Medicare payment-to-cost ratios were highest for AHC hospitals in areas with medium managed care penetration and lowest for AHC hospitals in areas with high managed care penetration. Medicaid payment-to-cost ratios were highest for AHC hospitals in areas with medium managed care penetration and lowest for AHC hospitals in areas with low managed care penetration. Private payer payment-to-cost ratios were highest for AHC hospitals in areas with low managed care penetration but the difference was small.

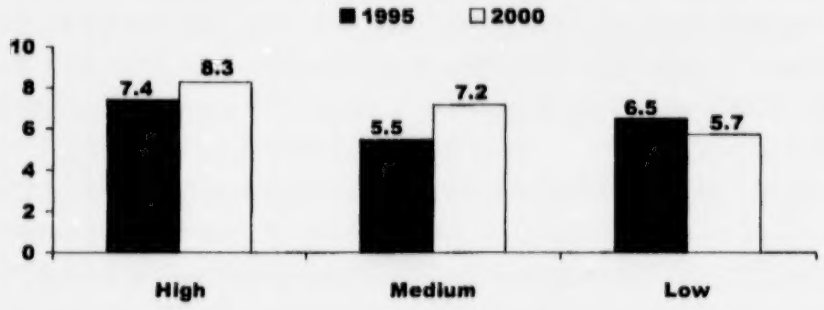
Exhibit 6-4. Payment-to-Cost Ratios by Level of Managed Care Penetration* for AHCs for 2000



* Managed care penetration is defined by the HMO penetration rate.
Low managed care penetration hospitals include AHCs that fell in the bottom quartile of HMO penetration in each year.
Moderate managed care penetration hospitals include AHCs that fell in the interquartile range of HMO penetration for each year.
High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

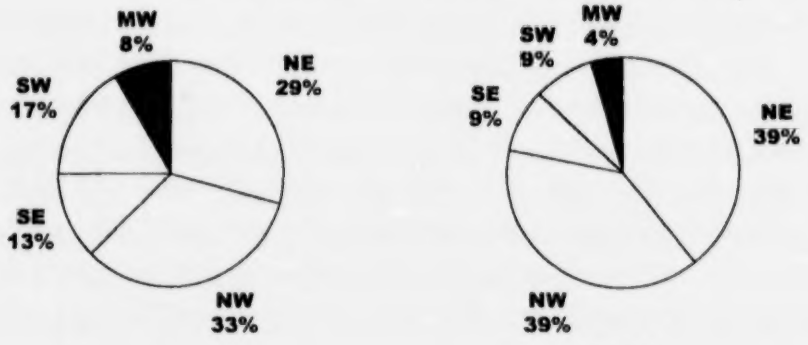
All three categories of AHC hospitals had higher percentages of uncompensated care as a percent of cost in 2000 than in 1995. In 2000, this percentage was highest for AHC hospitals in areas with high managed care penetration (8.3%) and lowest for AHC hospitals in areas with low managed care penetration (5.7%) (Exhibit 6-5). This finding indicates that some of the financial weakness of AHC hospitals in high managed care areas could be due to higher levels of uncompensated care as opposed to lower private sector payment-to-cost ratios, which are essentially identical (Exhibit 6-4).

Exhibit 6-5. Uncompensated Care as a Percent of Cost by Level of Managed Care Penetration* for AHCs, 1995 & 2000



* Managed care penetration is defined by the HMO penetration rate.
Low managed care penetration hospitals include AHCs that fell in the bottom quartile of HMO penetration in each year.
High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 6-6. Regional Distribution of AHCs Located in Areas with a "High" Level of Managed Care Penetration,* 1995 & 2000



* Managed care penetration is defined by the HMO penetration rate.
High managed care penetration hospitals include AHCs that fell in the top quartile of HMO penetration for each year.
Source: The Lewin Group analysis of AHA Annual Survey data.

Exhibit 6-6 shows the geographical distribution of AHC hospitals located in areas with high levels of managed care penetration in 1995 and 2000. In 2000, 39 percent of

these hospitals were located in the Northwest and 39 percent in the Northeast. The remaining 22 percent were located in the Southeast, Southwest, and Midwest. From 1995 to 2000, the regional distribution of AHC hospitals located in areas with high levels of managed care penetration shifted. The Northwest and Northeast became more competitive while the Midwest and Southwest became less so.

Trends in Academic Health Center Hospitals' Market Share

The increased competitiveness of health care markets throughout the 1990s may have resulted in a reduction in the market share of AHC hospitals, which have relatively high costs. To examine how patient volume at AHC hospitals and other teaching hospitals has changed over time, the authors examined occupancy rates, admissions, inpatient days, and average lengths of stay from 1994 to 2000 for each hospital type. The main finding that emerges from this analysis is that utilization at AHC hospitals and other major teaching hospitals varied little over the study period. Thus, the observed decline in relative AHC financial performance appears to be primarily driven by reductions in private payer payments relative to costs, rather than reductions in utilization. Below, the key points from the analysis of hospital utilization are presented.

- Occupancy rates for AHC hospitals were consistently higher than for all other hospitals and significantly higher than for large urban non-teaching hospitals (results not shown).
- Between 1994 and 2000, occupancy rates remained fairly stable for all hospital types, with slight increases for AHC hospitals and large urban non-teaching hospitals (results not shown).
- Overall, the distribution of admissions and adjusted admissions across hospital types changed little since 1994 (results not shown).[21] During the study period, AHC hospitals' share of admissions and adjusted admissions decreased only slightly, and major teaching hospitals' share of adjusted admissions increased slightly.
- Average lengths of stay across all hospital types decreased since 1994. This finding is consistent with an increasingly competitive health care system that applies pressure to control costs. It is interesting to note, however, that the average lengths of stay for AHC hospitals and major teaching hospitals increased slightly after 1997, whereas the average lengths of stay for minor teaching and large urban non-teaching hospitals declined over the entire study period.

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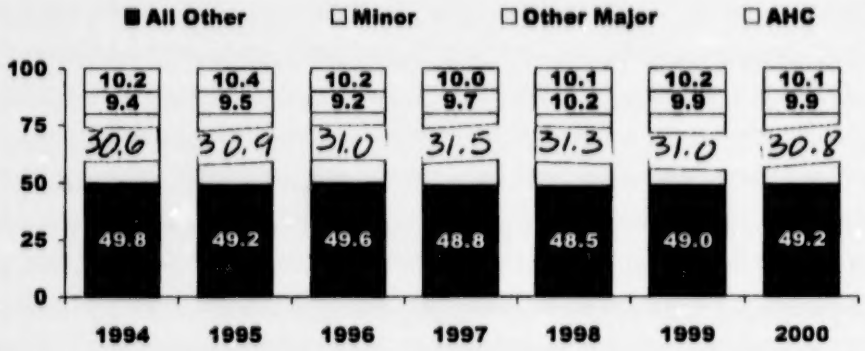
[21] We calculated adjusted admissions by multiplying inpatient admissions by the ratio of total hospital charges to charges for hospital inpatient services.

- The percent of inpatient days associated with each class of hospital has remained fairly constant since 1994 (Exhibit 6-7).

Exhibit 6-7. Trends in Percent of Inpatient Days by Type of Hospital, 1994–2000



Includes reported and imputed community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

VII. LOW FINANCIAL PERFORMERS

To maintain long-term financial viability and continue to provide communities with access to care, AHC hospitals must be able to generate positive operating margins, or at least positive total margins. Adequate margins are necessary for hospitals to generate net income to: (1) modernize and refurbish their physical plants and equipment; (2) acquire new technology to accommodate advances in medical practice; (3) meet changing community health care needs; (4) fund contingency and other reserves; and (5) raise needed capital, including debt. This section explores differences between high-, moderately, and low-performing AHC hospitals by contrasting their total margins, operating margins, payment-to-cost ratios, capacity, utilization, and efficiency.[22]

Distribution Analysis of Total Margins

A comparison of total margins for AHC hospitals and all U.S. hospitals revealed comparable trends across time. (Exhibit 7-1 shows trends for AHC hospitals; results for all

[22] In order to identify the characteristics of the AHC hospitals based on their financial performance, we categorized the AHC hospitals based on their total margin for 2000. AHC hospitals with a total margin above the 75th percentile were classified as "high-performing"; AHC hospitals with a total margin below the 25th percentile were classified as "low-performing"; and all other AHC hospitals were classified as "moderately performing."

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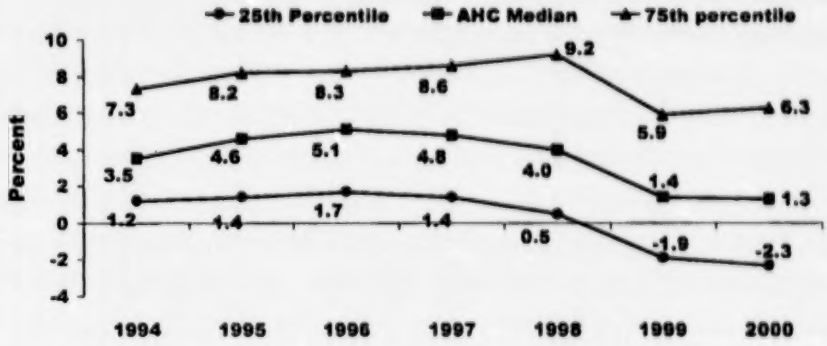
U.S. hospitals are not shown.) The difference in the total margins at the 25th and 75th percentile has been growing over time at about the same rate for AHC hospitals as for all other hospitals. The disparity in total margins for AHC hospitals at the 25th percentile and the 75th percentile increased from 6.1 percentage points in 1994 to 8.6 percentage points by 2000. The spread for all U.S. hospitals in 2000 was somewhat wider, at 10.3 percentage points (results not shown).

Exhibit 7-1. Trends in Distribution of Total Margins for AHCs, 1994–2000

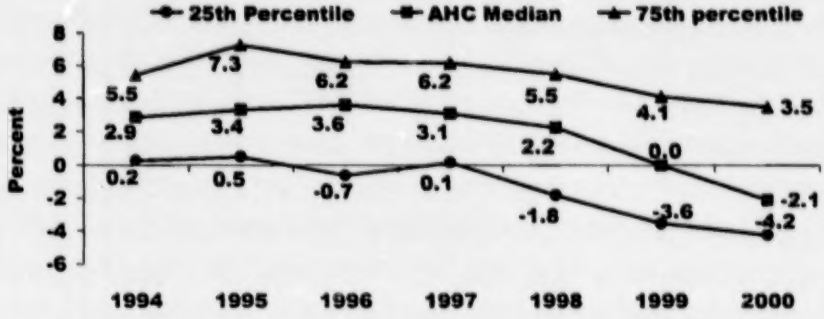


Total Margin = (net revenue – hospitals expenses)/net revenue.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

Distribution Analysis of Operating Margins

Operating margins for AHC hospitals and all U.S. hospitals also revealed comparable trends across time. (Exhibit 7-2 shows trends for AHC hospitals; results for all U.S. hospitals are not shown.) From 1994 to 2000, AHC hospitals in the bottom quartile had aggregate operating margins of less than 1 percent, and those operating margins have been negative since 1997. Exhibit 7-2 also shows a widening disparity between the operating margins at the 25th and 75th percentile for AHC hospitals. The disparity in operating margins for AHC hospitals at the 25th and 75th percentile increased from 5.3 percentage points in 1994 to 7.7 percentage points by 2000. Such a trend might indicate that the bottom quartile hospitals are doing relatively worse over time. Operating margins for AHC hospitals at the median and 75th percentile have been consistently less than operating margins for all U.S. hospitals at the median and 75th percentile (results not shown).

Exhibit 7-2. Trends in Distribution of Aggregate Operating Margins for AHCs, 1994–2000



Operating Margin = (net revenue – non-operating revenue – hospital expenses)/(net revenue – non-operating revenue).
Includes reported community hospitals data only.
Source: The Lewin Group analysis of AHA Annual Survey data.

A retrospective analysis of the top and bottom quartile of academic health centers showed that almost 80 percent of the top quartile hospitals in 2000 were also in the top quartile in 1999. Approximately 50 percent of the bottom quartile hospitals in 2000 were in the bottom quartile in 1999. Similar patterns were observed in the previous years. These results indicate more overall instability in the group of low-performing AHC hospitals than in the group of high-performing AHC hospitals.

Analysis of Academic Heath Center Hospitals Based on Financial Performance

Exhibit 7-3 compares AHC hospitals based on their 2000 financial performance. The analysis shows that high-performing AHC hospitals can be differentiated from low-performing AHC hospitals based on several factors:

- The Medicare payment-to-cost ratio was about 11 percentage points higher for the high-performing AHC hospitals than for the low-performing AHC hospitals.
- High-performing AHC hospitals have a higher (about 7.4 percentage points) proportion of Medicare costs than low-performing AHC hospitals.
- The Medicaid payment-to-cost ratio was about 18.6 percentage points higher for the high-performing AHC hospitals than for the low-performing AHC hospitals, presumably due to higher disproportionate share payments.
- High-performing AHC hospitals have a lower (about 9 percentage points) proportion of Medicaid costs than low-performing AHC hospitals; the higher Medicaid payment-to-cost ratio is thus particularly important.

- The private payer payment-to-cost ratio was about 20.6 percentage points higher for the high-performing AHC hospitals than for the low-performing AHC hospitals.
- High-performing AHC hospitals have a higher (almost five percentage points) proportion of private payer costs than low-performing AHC hospitals.
- Managed care penetration was lower in areas where high-performing AHC hospitals are located than in areas where low-performing AHC hospitals are located.
- The aggregate total and operating margins differ widely between high- and low-performing AHC hospitals.
- The percent of uncompensated care for high-performing AHC hospitals is slightly lower than for low-performing AHC hospitals.

The major differences between high and low-performing hospitals are primarily due to the payment-to-cost ratios, with some major payers paying less than costs and private payers paying considerably more than costs. Occupancy rates and average length of stay are comparable between high-performing and low-performing AHC hospitals.

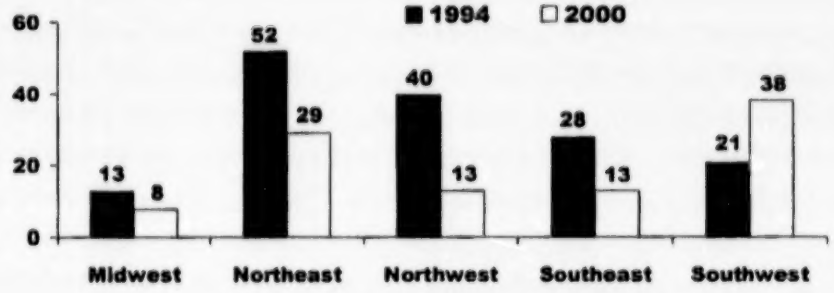
Exhibit 7-3. Comparison of AHCs by Financial Performance for 2000

	High-Performing	Moderately Performing	Low-Performing
Number of Hospitals	24	45	24
Medicare Payment-to-Cost Ratio	104.1%	100.4%	93.1%
Medicare as a Percent of Cost	30.6%	28.7%	23.2
Medicaid Payment-to-Cost Ratio	110.4%	92.1%	91.8%
Medicaid as a Percent of Cost	16.5%	18.0%	25.2%
Private Payer Payment-to-Cost Ratio	117.9%	108.6%	97.4%
Private Payer as a Percent of Cost	40.9%	39.0%	35.2%
FTEs per Bed	6.7	7.3	6.6
Percent of Managed Care Penetration	33.6%	37.8%	37.7%
Occupancy	78%	78%	75%
Average Length of Stay	6.3	6.5	6.1
Aggregate Total Margin	12.8%	1.3%	-11.7%
Aggregate Operating Margin	7.1%	-0.6%	-13.8%
Efficiency Index (All Payer)	1.05	1.03	0.99
Efficiency Index (Medicare)	1.04	1.01	1.00
Percent of Uncompensated Care	5.2%	6.4%	11.1%

Low-performing hospitals include academic health centers that fell in the bottom quartile of total margins in 2000.
Moderately performing hospitals include academic health centers that fell in the interquartile range of total margins in 2000.
High-performing hospitals include academic health centers that fell in the top quartile of total margins in 2000.
Includes reported community hospitals data only.
Source: The Lewin Group analysis of 2000 AHA Annual Survey data.

Exhibit 7-4 presents trends in the percent of low-performing AHC hospitals by region for 1994 and 2000. Between 1994 and 2000, the Midwest, Northeast, Northwest, and Southeast experienced a decrease in the percentage of AHC hospitals that were low performers. The Southwest, however, experienced an increase in the percentage of AHC hospitals that were low performers.

Exhibit 7-4. Trends in Percent of Low-Performing AHCs by Region, 1994 & 2000



Low-performing hospitals include academic health centers that fell in the bottom quartile of total margins in 2000.
Percent of low-performing AHCs = number of low-performing AHCs in the region/total number of AHCs in region.
Source: The Lewin Group analysis of AHA Annual Survey data.

VIII. FUTURE FINANCIAL PERFORMANCE OF ACADEMIC HEALTH CENTER HOSPITALS

An analysis of hospital margins and payment-to-cost ratios indicates a decline in the financial performance of hospitals since 1996. AHC hospitals and major teaching hospitals have fared particularly poorly. According to data from the AAMC quarterly survey (results not shown), the financial status of teaching hospitals improved in the second quarter of 2001, but deteriorated again in the third quarter of 2001 (fourth quarter data were not available when the report was drafted).[23] These preliminary AAMC results suggest that an improvement in the 2001 financial performance of teaching hospitals is in doubt.

If the trends in aggregate total and operating margins continue, reductions in teaching hospitals' mission-related activities might be more pronounced. Therefore, it is

[23] The AAMC surveys members of its Council of Teaching Hospitals. The survey is based on a non-representative sample. Consequently, the results may not generalize to the larger population of teaching hospitals.

important to consider the future financial status of AHC hospitals, given their critical role in the provision of mission-related activities.

The Lewin Group employed its Margin Projection Model (MPM), which simulates future revenue and costs, to project total and operating margins for AHC hospitals. This study used the MPM to project total and operating margins from 2001 to 2005 for AHC hospitals based on 2000 financial data from the AHA Annual Survey. It only allowed Medicare payments and costs to change based on The Lewin Group's analysis of the Balanced Budget Act of 1997, the Balanced Budget Refinement Act of 1999, and the Medicare, Medicaid, and SCHIP Benefits Improvement and Protection Act of 2000. In the MPM, payer mix and payment-to-cost ratios for payers other than Medicare were held constant at 2000 levels.

Exhibit 8-1. Projected Aggregate Total and Operating Margins for AHCs, 2000–2005*

	2000**	2001	2002	2003	2004	2005
Total Margins	1.7%	1.5%	1.3%	0.6%	0.5%	0.3%
Operating Margins	–1.4%	–1.5%	–1.6%	–2.2%	–2.3%	–2.4%

* Assumes costs grow at same rate as Medical Market Basket Index.

** 2000 Total and Operating Margins are calculated from data reported in the 2000 AHA Annual Survey. Analysis includes projections for AHC hospitals that reported in 2000.

Source: The Lewin Group analysis of 2000 AHA Annual Survey data

Although the AAMC survey data indicate that teaching hospital margins may have increased for the second quarter of 2001, whether or not this demonstrates a general improvement in the financial performance of AHC hospitals and other teaching hospitals is not clear, and trends need to be carefully monitored. Based on the Lewin MPM and future Medicare payments, the financial performance of AHC hospitals is projected to decline through 2005. This study's modeling assumes no improvement in private payer payments relative to costs from 2000 levels. Given demands to hold down premiums, payments by private payers are not likely to improve. If the assumptions of the model hold true, AHC hospitals will face continued pressure to curtail their mission-related activities. The authors' future research will monitor the extent to which this occurs.

IX. DISCUSSION

This report indicates that the financial performance of AHC hospitals, and teaching hospitals generally, deteriorated between 1994 and 2000. AHC hospitals' financial performance has also deteriorated relative to that of other hospitals. In 2000, 25 percent of AHC hospitals had total and operating margins below –2.3 and –4.2 percent, respectively.

As indicated throughout this report, the overall declining performance of AHC hospitals is primarily due to the pronounced decrease in private payer payment-to-cost ratios coupled with increases in the level of uncompensated care. The observed decrease in private payer payments relative to costs for teaching hospitals may not be due to increased costs, as AHC hospitals have maintained their relative levels of efficiency. Furthermore, the teaching hospital market share remained almost unchanged during this period, indicating that the deteriorating financial status of AHC hospitals is not a result of relative volume reductions.

Payments from Medicare and private insurers are not likely to increase in the future, putting additional financial strain on AHC hospitals. With the predicted increase in health care costs, all payers—public and private alike—will probably intensify their efforts to contain their health care costs. The form this cost control will take, given the current backlash to managed care, is difficult to predict. However, many of the cost-control efforts are likely to be directed at hospitals generally (given concerns about potential excess hospital capacity in terms of beds per thousand), and at teaching hospitals in particular (given their relatively high cost structures). The effects of any cost-control policies on the financial status of hospitals could be compounded by decreases in non-operating revenue associated with the recent marked decline in the equities market.

If AHC hospitals are unable to subsidize mission-related activities with income from patient care revenue, the academic and social missions of AHC hospitals and other teaching hospitals could be jeopardized. This is particularly true because mission-related activities tend to be interrelated and mutually supportive. For example, medical training and education flourish in environments where new medical research is being pursued and where high technology, specialty programs, and equipment are available. In addition, clinical research programs often attract patients with rare and unusual medical conditions or problems and/or with heavier care needs—the very patients treated in the specialty programs available at major teaching institutions. Consequently, if financial difficulties cause AHC hospitals and other teaching institutions to curtail part of their mission-related activities, the successful pursuit of all their missions could suffer.

APPENDIX. HOSPITAL EFFICIENCY MODEL

The Lewin Group's "Hospital Efficiency Model" is a regression-based model that predicts inpatient cost per case as a function of payment and other explanatory variables. The model uses the following "double log" regression specification:

$$\log(CPC_i) = \alpha_0 + \sum_j \alpha_j * \log(X_{ji}) + \sum_k \beta_k Z_{ki} + \varepsilon_i$$

where

- i indexes each hospital, j indexes independent variables entered in log form, and k indexes variables entered in level form;
- $\log(CPC_i)$—the log of cost per case (either Medicare or all-payer). We subtract direct medical education (DME) costs before calculating cost per case;
- α_0, α_j, and β_k are estimated coefficients;
- $\text{Log}(X_{ji})$—the set of independent variables entered in log form. Almost all continuous independent variables are entered in log form;
- Z_{ki}—the set of independent variables entered in level form. These include dichotomous, "yes/no" variables (e.g., urban status); and,
- ε_i—an error term.

This equation is then estimated for all acute care hospitals in the Medicare Hospital Cost Report Information System Minimum Data Set (HCRIS). There are approximately 4,800 hospitals in each HCRIS data set. The current version of our model is based on fiscal year 1998 (FY98) data, also known as the 15th year of the Medicare Prospective Payment System (PPS15). Our analysis uses HCRIS data based on fiscal years 1996, 1997, and 1998 (PPS13, PPS14, and PPS15, respectively). In addition to HCRIS data, our model also relies on Area Resource File (ARF) data and data from the Medicare Inpatient Impact File. We estimate these equations using a weighted least squares technique, where the weights are the number of inpatient discharges (total discharges for all-payer models and Medicare discharges for Medicare models) for each hospital. After estimating this equation, we convert its predicted log cost-per-case values for each hospital into dollar-denominated cost-per-case estimates using a smearing technique.

The resulting predicted cost per case for each hospital indicates the cost per case that a "typical" hospital with exactly those characteristics (the hospital's payment and other explanatory variables) would be expected to have. In effect, this predicted value establishes a unique, "average" standard of performance for each acute care hospital. We then compare each hospital's predicted cost per case with its actual cost per case. To do this, we create an "efficiency ratio" by calculating the ratio of actual cost per case to predicted cost per case. A hospital with an "efficiency ratio" greater than 1.0 is a hospital whose actual cost per case exceeds its predicted cost per case. Our model considers such a hospital to be inefficient because the hospital's actual cost per case is higher than the cost per case that a typical hospital with exactly the same characteristics is expected to have. Conversely, a hospital with an "efficiency ratio" less than 1.0 is a hospital whose actual cost per case is less than its predicted cost per case. Our model considers such a hospital to be efficient, because the hospital's actual cost per case is less than the cost per case that a typical hospital with exactly the same characteristics is expected to have.

Our model can also compare the efficiency of different hospital groups. This is possible by aggregating the actual and predicted costs per case for all hospitals within a particular group. The aggregate actual and predicted costs per case for each group can then be compared.

Data

For our hospital efficiency model analysis, the following data sources were combined to form a single database:

The Hospital Cost Report Information System Minimum Data Set (HCRIS): HCRIS is maintained by the Health Care Financing Administration (HCFA) and provides information on Medicare costs, which is updated annually, for Medicare-certified hospitals. The model uses information from HCRIS on total and Medicare discharges, inpatient costs, and various case-mix and payment variables.

Area Resource File (ARF): The Area Resource File, maintained by the Public Health Service, is a county-level database that provides demographic and economic information (i.e., population estimates, per capita income, poverty rates, and percent of population 65 and older) as well as hospital-specific information (i.e., the number of beds per 1,000 and the number of physicians per 1,000). ARF data were included to control for variations in costs across local hospital markets.

Medicare Inpatient Impact File: The Impac
includes information for Prospective Pa
these hospitals to estimate their total pay
System. The Impact File provides infor
urban/rural status, and teaching status a
(IRB) ratio.

Since the Medicare cost report (
Medicare inpatient costs, the Medicare
fit than the all-payer model. An all-payer
Medicare cost report, so the Medicare c
births, other special care days, and long-
all-payer case-mix. As a result, the all-p
the case-mix proxy variables most likely
payer analysis. Since HCRIS does not p
inpatient costs, a "step-down" formula
per case = total facility costs * (inpatien

t File, a public-use file maintained by HCFA,
/ment System (PPS) hospitals only, and allows
ments under the Medicare Prospective Payment
nation on Medicare PPS payment data,
measured by the intern- and resident-to-bed

HCRIS) only provides direct estimates for
cost per case model has a stronger overall statistical
r case-mix variable is also not available in the
ase-mix variable and other proxy variables (i.e.,
term care days) were used to reflect variations in
ayer cost-per-case "step-down" calculations and
introduced some measurement error into the all-
rovide any direct data on all-payer hospital
is used to estimate all-payer cost per case: total cost
t charges/total charges).

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#516 *Training Tomorrow's Doctors: The Medical Education Mission of Academic Health Centers* (April 2002). This policy report from The Commonwealth Fund Task Force on Academic Health Centers asserts that training at our nation's teaching hospitals may not be keeping pace with the changing nature and demands of modern medical practice. The report details curriculum inadequacies, changing medical practices, and the uneven nature of medical education across the country. It also reveals that there is not enough data to measure adequately the performance of academic health centers in conducting their educational missions or assessing the associated costs.

#500 *Preparedness for Clinical Practice: Reports of Final-Year Residents at Academic Health Centers* (September 5, 2001). David Blumenthal, Manjusha Gokhale, Eric G. Campbell, and Joel S. Weissman. *Journal of the American Medical Association,* vol. 286. According to this study, more than one of 10 medical residents say they feel unprepared to handle certain treatments and procedures relative to their specialties despite years of solid training.

The Relationship of Market Forces to the Satisfaction of Faculty at Academic Health Centers (September 2001). David Blumenthal, Nancyanne Causino, Eric G. Campbell, and Joel S. Weissman. *American Journal of Medicine,* vol. 111, no. 4. Copies are available from *American Journal of Medicine,* Box 0121, University of California, San Francisco, San Francisco, CA 94143-0121, Tel: 415-447-6100, Fax: 415-447-2799, E-mail: ajm@medicine.ucsf.edu.

#486 *Status of Clinical Research in Academic Health Centers: Views from the Research Leadership* (August 15, 2001). Eric G. Campbell, Joel S. Weissman, Ernest Moy, and David Blumenthal. *Journal of the American Medical Association,* vol. 286, no. 7. In this study, the authors report that close to half of the research leaders at U.S. medical schools do not consider their clinical research enterprises to be healthy or robust, and that they also question the overall quality of the clinical research being conducted.

#443 *A Shared Responsibility: Academic Health Centers and the Provision of Care to the Poor and Uninsured* (April 2001). This policy report of The Commonwealth Fund Task Force on Academic Health Centers recommends revamping the way care for the poor and uninsured is financed in the United States, with proposals ranging from expanding health coverage for the uninsured to revising Medicare and Medicaid payment policies for teaching hospitals.

#408 *Managing Academic Health Centers: Meeting the Challenges of the New Health Care World* (October 2000). This report of The Commonwealth Fund Task Force on Academic Health Centers describes strategies undertaken by the nation's academic health centers (AHCs) to improve management of their patient care and research missions in the face of continuing tumult in the U.S. health care system.

#390 *Health Care at the Cutting Edge: The Role of Academic Health Centers in the Provision of Specialty Care* (July 2000). This policy report of The Commonwealth Fund Task Force on Academic Health Centers identifies the specialty care mission of academic health centers (AHCs), shows how AHCs

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are the main providers and initial developers of many rare procedures and treatments, and reports that AHCs provide a disproportionate share of specialty services to poor and uninsured patients.

A Tale of Two Systems: The Changing Academic Health Center (May/June 2000). David Blumenthal and Nigel Edwards. *Health Affairs,* vol. 19, no. 3. Copies are available from *Health Affairs,* 7500 Old Georgetown Road, Suite 600, Bethesda, MD 20814-6133, Tel: 301-656-7401 ext. 200, Fax: 301-654-2845, www.healthaffairs.org.

Distribution of Research Awards from the National Institutes of Health Among Medical Schools (January 27, 2000). Ernest Moy, Paul F. Griner, David R. Challoner, and David R. Perry. *New England Journal of Medicine,* vol. 342, no. 4. Copies are available from Customer Service, New England Journal of Medicine, P.O. Box 549140, Waltham, MA 02454-9140, Fax: 800-THE-NEJM, (800-843-6356), www.nejm.org.

#381 *Trends in Specialized Surgical Procedures at Teaching and Nonteaching Hospitals* (January/February 2000). Rebecca Levin, Ernest Moy, and Paul F. Griner. *Health Affairs,* vol. 19, no. 1. This article examines how the risks and high costs associated with the large number of complex surgical procedures performed by major teaching hospitals have serious implications for the perceived efficiency of these institutions.

Academic Health Centers on the Front Lines: Survival Strategies in Highly Competitive Markets (September 1999). David Blumenthal, Joel S. Weissman, and Paul F. Griner. *Academic Medicine,* vol. 74, no. 9. In this article, the authors describe approaches that five academic health centers have taken to reduce costs, enhance quality, or improve their market positions since the onset of price competition and managed care. Copies are available from David Blumenthal, M.D., Institute for Health Policy, Massachusetts General Hospital, 50 Staniford Street, Boston, MA 02114.

#330 *New Approaches to Academic Health Center Affiliations: Public Hospitals and the Department of Veterans Affairs* (April 1999). Jo Ivey Boufford, Larry Gage, Kenneth W. Kizer, Luis R. Marcos, John H. Short, and Katherine E. Garrett. This issue brief summarizes a panel discussion regarding new approaches to academic health center affiliations that took place at New York University's Robert F. Wagner Graduate School of Public Service.

#312 *From Bench to Bedside: Preserving the Research Mission of Academic Health Centers* (April 1999). This policy report of The Commonwealth Fund Task Force on Academic Health Centers is intended to provide a resource for future policy development and management related to research mission of academic health centers. It also examines how recent changes in the health care market and public policies may hamper the ability of academic health centers to conduct research as effectively as they have in the past.

#337 *Market Forces and Unsponsored Research in Academic Health Centers* (March 24/31, 1999). Joel S. Weissman, Demet Saglam, Eric G. Campbell, Nancyanne Causino, and David Blumenthal. *The Journal of the American Medical Association*, vol. 281, no. 12. This article looks at how increased competitive pressures on academic health centers may result in reduced discretionary funds from patient care revenues to support unsponsored research, including institutionally funded and faculty-supported activities.

#307 *Patterns of Specialty Care: Academic Health Centers and the Patient Care Mission* (January 1999). James A. Reuter, Georgetown University. The author defines the specialty care mission, presents an initial qualitative evaluation of patterns of this care in academic health centers, major teaching hospitals, and non-teaching hospitals, and attempts to identify measures for tracking future changes in the provision of specialty care.

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